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HEARING

BEFORE THE

U. S.

COMMITTEE ON MILITARY AFFAIRS

HOUSE OF REPRESENTATIVES

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ON

H. R. 7117

A BILL TO INCREASE THE EFFICIENCY OF THE ENGINEER CORPS
OF THE UNITED STATES ARMY



WASHINGTON
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INCREASE OF EFFICIENCY OF ENGINEER CORPS, U. S. ARMY.

COMMITTEE ON MILITARY AFFAIRS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., Tuesday, March 8, 1910.

The committee met this day at 10.30 o'clock a. m., Hon. John A. T. Hull (chairman), presiding.

The CHAIRMAN. Gentlemen, the bill under consideration this morning is H. R. 7117, to increase the efficiency of the Engineer Corps of the United States Army.

General Marshall is not here, but his corps is represented by the ex-chief and by present officers on the active list. We do not care to designate who will be heard. If the engineers will designate whom they desire first, we will be glad to hear from them.

STATEMENTS OF BRIG. GEN. ALEXANDER MACKENZIE (RETIRED), FORMER CHIEF OF ENGINEERS; COL. FREDERIC V. ABBOT AND MAJ. WILLIAM B. LADUE, U. S. ARMY, ASSISTANTS TO THE CHIEF OF ENGINEERS; AND MAJ. GEN. J. FRANKLIN BELL, U. S. ARMY, CHIEF OF STAFF.

Colonel ABBOT. General Marshall was very anxious that General Mackenzie should be heard first. Otherwise, I am the Acting Chief of Engineers.

General MACKENZIE. Colonel Abbot, of course, is the acting chief, and he represents now all the corps, and while I am glad to be here and will be glad to give the committee any information I may have on the points discussed, it struck me that perhaps the active representatives of the corps should present the matter.

The CHAIRMAN. That is a question for you to determine. I think the committee will be glad to hear all of you. Colonel Abbot, you, of course, have read this bill?

Colonel ABBOT. Yes, sir.

The CHAIRMAN. Now, to get it in the hearing, can you tell us the number of colonels you have now in the corps?

Colonel ABBOT. Ten colonels, 16 lieutenant-colonels, 32 majors, 43 captains, 43 first lieutenants, 43 second lieutenants, which with the Chief of Engineers make 188 total.

The CHAIRMAN. How many majors have you now?

Colonel ABBOT. Thirty-two.

The CHAIRMAN. How many captains have you on the roll?

Colonel ABBOT. Forty-three.

The CHAIRMAN. How many first lieutenants?

Colonel ABBOT. Forty-three.

The CHAIRMAN. How many second lieutenants?

Colonel ABBOT. We should have 43, but there are some vacancies at the present time which we have not been able to fill.

The CHAIRMAN. Forty-three is the number provided by law?

Colonel ABBOT. Forty-three is the number provided by law.

Mr. STEVENS. Colonel, how many vacancies?

Colonel ABBOT. There are ten vacancies to-day.

Mr. MORGAN. In all the grades?

Colonel ABBOT. In the lowest grade, that of second lieutenant.

The CHAIRMAN. You have no vacancies in the upper grades, of course?

Colonel ABBOT. No, sir.

The CHAIRMAN. I see you provide here that it is to take five years to make these increases. It is desired that the period be extended over five years. Is that so that you can secure graduates from West Point?

Colonel ABBOT. It is so that we can increase the corps symmetrically and secure the class of men that we need to fill these positions. We do not want to take in too many at the same time of exactly the same age.

Mr. STEVENS. Colonel, why can you not fill those ten vacancies of second lieutenant. Are you saving those for a nucleus?

Colonel ABBOT. No, sir; we were near filled up last June, but vacancies occurred, and we propose to fill up when we can. We estimate that with the present vacancies and those covered in the bill it will take about six years before the new organization, if this becomes a law, will be entirely filled.

Mr. STEVENS. Can you tell us how many of these 188 officers are under the direct charge of the Chief of Engineers engaged in military work, how many in river and harbor work and public improvements, and how many on detached service?

Colonel ABBOT. We have that all tabulated here. At the time this statement was made, which was at the close of 1909, there were in the office of Chief of Engineers 7 officers; there were on duty of a character not strictly military, 50; there were on strictly military duty, 77; there were on duty of a military nature and not strictly military duty combined, 29 officers; there were those on leave of absence and on sick leave, 20. That, at this time, included the graduates from West Point. There were 15 men assigned to the corps, and they were at that time on graduating leave. This is dated June 30.

Mr. YOUNG. So that that would leave only 5 actually on leave of absence and sick leave?

Colonel ABBOT. Yes, sir. The total that were under the absolute control of the Chief of Engineers was 46. There were 24 additional officers, who were partly under the control of the Chief of Engineers and partly on duty not under his control. There were 92 officers that were beyond the control of the Chief of Engineers.

Mr. STEVENS. What do you mean by that?

Colonel ABBOT. Those who are assigned to troops; those who are on light-house duty in the Department of Commerce and Labor; those who are instructors at West Point; duty that is entirely beyond the charge of the Chief of Engineers. His hold on these men is only that he can ask to have them relieved when they get to the end of the tour of duty to which they are assigned, and replace them by somebody else.

The CHAIRMAN. Colonel, how many have you on duty with the Light-House Board?

Colonel ABBOT. Eleven, as I recollect it.

The CHAIRMAN. My understanding is that they will be relieved of that duty if a certain bill passes.

Colonel ABBOT. The officers that are on actual duty with the Light-House Board and not under the Chief of Engineers are only two. That is the engineer secretary of the board and the engineer officer in the third light-house district. The others are simply officers who are now under the Chief of Engineers on river and harbor duty, but in addition perform light-house duties under the Secretary of Commerce and Labor; so that bill you are speaking of would only affect two officers. If the light-house work was taken away, we would thereby gain only two men, who are now entirely out of the control of the Chief of Engineers.

Mr. STEVENS. How many have you on the Panama service?

Colonel ABBOT. We have at the present time 10 on construction duty and 15 under instruction. This is the same 15 that were on leave of absence on the 30th of June, new officers; they are now down at the Panama Canal on a temporary assignment for instruction. It takes the place of a portion of a year's instruction at the school.

Mr. STEVENS. A part of them will come back here to this country?

Colonel ABBOT. Yes; at the end of a short tour, during the first year of a young officer's service, the custom is that they shall pass from one large work to another, spending a short time at each, writing a thesis on what they have seen and learned and then moving to another large work and examining it and submitting a thesis; so that these young officers who are now on the Panama Canal will about the 1st of April be returned to this country and assigned to important works here, still under instruction. For two years they are under instruction. One year is spent in the actual examination of practical work with the officers in charge of districts as actual instructors; the second year they come and perfect their theoretical knowledge at the Engineer's School at Washington Barracks.

Mr. YOUNG. That process will go on with the new men, so that there will always be that number or more?

Colonel ABBOT. Yes; depending on how fast we succeed in getting officers added to the corps. They will always be distributed that way.

Mr. YOUNG. In other words, when the new men come in they have to be trained?

Colonel ABBOT. Yes. They are crude material, which must be formed, and that is the way we form it.

The CHAIRMAN. What rank are the officers in charge of the main works of rivers and harbors?

Colonel ABBOT. The largest district and division engineers are, or should be, colonels and lieutenant-colonels. The smaller districts are, as far as we can make it so, in charge of majors and captains. The lieutenants should be learning largely as assistants. It is not always possible to divide the assignments exactly in that way, because we have to use officers wherever we can now.

The CHAIRMAN. It looks to me, Colonel, in your scale here as though you have a very large number, say, of lieutenant-colonels, compared with the number of first and second lieutenants. You have 43 second lieutenants and 56 first lieutenants. That is a little more than 2 lieutenants to 1 lieutenant-colonel; more than that.

Mr. YOUNG. How does it compare with the Ordnance Corps?

Colonel ABBOT. This is formed on the ordnance organization almost exactly, eliminating the second lieutenants, because the Ordnance Department has no second lieutenants.

Mr. YOUNG. So that your grade is lower than the Ordnance Corps on account of not having second lieutenants. Otherwise it would grade the same?

Colonel ABBOT. Yes. We have 204 officers, excluding second lieutenants, and one brigadier-general, who is Chief of Engineers, and who is at the head of 204 officers of engineers, whereas the brigadier-general of ordnance is at the head of only 88 officers of ordnance.

Mr. STEVENS. Is that the thing we want to base this action upon? Is it not rather the particular kind of work this corps has to do? How many classes of duties has the Engineer Corps to perform?

Mr. YOUNG. Before you go into that, let me complete my question on this line. I just wanted to ask one question along the line of yours. Both of these corps, the ordnance and the engineer, are highly specialized corps, are they not?

Colonel ABBOT. Yes, sir.

Mr. YOUNG. Doing a special kind of work?

Colonel ABBOT. Yes, sir. The officers of the Corps of Engineers on January 20, 1910, were performing 1,724 different independent pieces of work of different characters.

Mr. STEVENS. Classify them.

Colonel ABBOT. There was in command of the corps, 1; officers on boards and commissions, 137; acting as division engineers, 9; in light-house districts, 16; on river and harbor improvements, 791; on fortifications, 25; on surveys, 100; on supervision of the construction of commercial bridges, 471; chief engineer officers of military divisions and departments, 9; on Isthmian Canal, 25, of which 10 were engaged in actual construction and 15 were being instructed.

Mr. YOUNG. You are giving the jobs of the men?

Colonel ABBOT. Yes; I am giving the jobs of the men. On construction of buildings, 2; the government of the District of Columbia, 3; erection of monuments, 10; the purchase of equipment and search-lights, 3; with troops, 56; at engineer and service schools, 33; on the surveys of northern and northwestern lakes, 1; public buildings and grounds, District of Columbia, 1; Washington Aqueduct, 2; on the General Staff and at the War College, 2; at the United States Military Academy, 10; in the Yellowstone National Park, 1; in charge of the State, War, and Navy building, 1; assistants to the Chief of Engineers, 6; and assistants to the District officers, 9; making a total number of individual duties that are assigned to the 178 officers now actually in our corps on the 20th of January of 1,724, which means about ten different classes of work to each individual officer of the corps at the present time.

Mr. STEVENS. Now you have the strictly military work of engineers and fortifications?

Colonel ABBOT. Yes, sir.

Mr. STEVENS. What other military work have you?

Colonel ABBOT. The work of chief engineers of military departments, which are important places and to which an officer should be assigned. We can give these military departments only a very small fraction of one of our officers whose time is fully occupied with other

classes of work, and we consequently hear from the commanding generals of the department that they would like to assign a good deal of important work to the chief engineers of their departments, but they can not get the service from them. They are too busy. We can not fully cover that military duty, because we can only lend to the military side a small fraction of a man whose main duty is probably fortifications and river and harbor work, and possibly light-house work at the same time.

Mr. STEVENS. Now, the assignment to West Point is part of the military duty?

Colonel ABBOT. Yes, sir; instructors. Then we have instructors out at Leavenworth also.

Mr. YOUNG. You regard this all as military?

Colonel ABBOT. Yes; we regard this all as military. The river and harbor work is also military in its character. We thereby provide harbors by which our navy can get to their navy-yards. There were only three harbors in the whole country, originally, which one of these modern vessels could enter, but we have made it possible for them to get to the navy-yards the large ships which they are now building.

Mr. STEVENS. You would not assume that more than a very small proportion of the river and harbor work is military?

Colonel ABBOT. It is also military in this sense, that it is military training for the officers, who would do exactly the same work as they would do in the case of war.

Mr. STEVENS. We would not spend \$40,000,000 for that work?

Colonel ABBOT. No, sir; but while we are learning our profession by doing this work it is also work that is of value to the United States, and gives back the pay and other expenses of keeping the officers.

Mr. YOUNG. This kind of work dates back since the beginning of the Government?

Colonel ABBOT. Yes, sir.

The CHAIRMAN. Going back to one proposition, you have compared it with the Ordnance Corps. Is yours a detailed corps?

Colonel ABBOT. No, sir.

The CHAIRMAN. Is the Ordnance Corps a detailed corps?

Colonel ABBOT. Yes, sir.

The CHAIRMAN. Do they get their promotion from the line or from the corps?

Colonel ABBOT. They get their promotion up through the line, with an advantage which General Mackenzie is particularly fitted to explain.

The CHAIRMAN. They get one grade higher while serving?

Colonel ABBOT. Yes. They can get to be majors of ordnance as soon as they become captains of the line. After they get to be majors they do not go back to the line unless the Ordnance Department wants to get rid of them.

The CHAIRMAN. That is to say, they are not permanent officers in the corps?

Colonel ABBOT. They might go back to the line, but the probability of their being sent back is not great.

Mr. YOUNG. As a matter of fact they do not go back unless they prove inefficient?

Colonel ABBOT. No; they do not go back unless they prove inefficient. If they do, they leave a vacancy in the ordnance corps which

is filled either by promotion of one of the captains or transfer of a man from the line.

The CHAIRMAN. My impression is that the ordnance is a detailed corps, and that after they reach a certain rank they may be detailed without going back to the certain rank in the line.

Colonel ABBOT. Yes, sir.

General MACKENZIE. At the present time there are only two field detailed officers in the ordnance.

The CHAIRMAN. That is true of several detailed corps, is it not; the quartermaster's corps and others?

General MACKENZIE. At the time the change of detail was made from two years' service to one year's service, the reason was given by the Secretary of War that this change would make the service in the ordnance more continuous, not with the idea of changing, but it will result simply in men coming back who have served previously in the ordnance.

The CHAIRMAN. When a man has done good work you want him back?

General MACKENZIE. Yes. When a man has been detailed as major he will have served one or two terms as captain and proved himself useful, and the chances are almost certain that they will stay there when they reach there. After they reach their majority, theirs will be a continuous service.

The CHAIRMAN. But their permanent positions come from the line, practically?

General MACKENZIE. Yes.

Mr. HAY. Colonel, when was the Engineer Corps increased before?

Colonel ABBOT. In 1904.

Mr. HAY. By how much?

Colonel ABBOT. By 28 officers.

Mr. HAY. Have you the hearings there that we had on the bill at that time?

Colonel ABBOT. No, sir.

Mr. TILSON. Mr. Chairman, I would like to ask the Colonel if he will repeat the number of engineer officers on service in the District of Columbia. It impressed me, as you read the list, that it was rather an unusual number.

The CHAIRMAN. You do not mean working in the War Department?

Mr. TILSON. No; I mean in the government of the District of Columbia or stationed here in the District of Columbia.

Colonel ABBOT. That is a different thing.

Mr. SLAYDEN. How many are there within the boundaries of the District of Columbia?

Mr. TILSON. Yes.

Colonel ABBOT. The officers going to school at Washington Barracks are within the limits of the District of Columbia.

Mr. STEVENS. It seems to me we have the strictly military service. I was trying to find out how many were engaged in strictly military service, and then there is a semimilitary service, as you claim, and then there is service in the schools.

The CHAIRMAN. It would not be fair to charge the student officers as being occupied here, because they are solely students. But that can be explained in his answer.

Mr. TILSON. It seemed to me, when he read them, there were a number not only engaged in semicivil work, but work altogether in connection with the government of the District of Columbia.

Colonel ABBOT. There are three in the District government. At the engineers' school there are 22. We have also the officers in charge of the aqueduct, who are not in the District government, though. The District commissioner (the engineer commissioner) and his two assistants are the three.

Mr. TILSON. Whose duty is it to maintain the aqueduct?

Colonel ABBOT. The engineers'.

Mr. STEVENS. There is an officer in charge of public buildings and grounds?

Colonel ABBOT. Yes.

Mr. TILSON. Is not the aqueduct for the District of Columbia?

Colonel ABBOT. It is maintained by the Government of the United States, and is not under the District government.

Mr. YOUNG. I have in my hand Form 87, a private document issued in the War Department, prepared by Colonel Abbot, dated October 20, 1909, which shows at that time just what each officer in this corps was doing.

Mr. SLAYDEN. What document was that?

Mr. YOUNG. It is called a statement showing the rank and duties of the Corps of Engineers. It shows just what each man is doing, and I would just like to read one of these for the information of the committee. I will read No. 5, Colonel Black, who is—

In charge of the improvement of the harbors of Peekskill, Rondout, Saugerties; Coney Island Channel, New Hork Harbor; harbors of Tarrytown, Port Chester, Glencove, Flushing Bay, Port Jefferson, Mattituck, Huntington, Mamaroneck, Larchmont, Canarsie Bay, Sag Harbor, and Echo Bay; Great South Bay, East River, and Hell Gate, Hudson River, Harlem River, Newtown Creek, Bronx River, and East Chester Creek, Browns and Wappinger creeks, and Wallabout Channel; of examination and survey for intracoastal waterway across New Jersey and in upper Delaware River; of survey of Hudson River from deep water in the lower river to Waterford, Sterling Basin, Greenport Harbor, Hempstead Harbor, Jamaica Bay to Peconic Bay, Flushing Bay, Huntington Harbor, Sheepshead Bay, East River (including Little Hell Gate), Mamaroneck Harbor, Harlem River, Hudson River at Coeymans, at Albany, and at Troy, and of removal of a wreck in Hudson River, N. Y. To supervise the construction of bridges across Hudson (2), East (4), Bronx (2), Harlem (2), and Mattituck rivers, Hutchinson River (East Chester Creek, 2), East Chester Bay and Creek (2), Newtown, Hook (2), Coney Island, Wappinger, and Dutch Kills creeks, Doodletown Bight or Creek, Beach Channel in Jamaica Bay, Shinnecock and Peconic Canal, and Fosters Meadow Canal, N. Y. Member of board of engineer officers to make a survey for a continuous inland waterway from Boston, Mass., to Beaufort, N. C. Member of board of officers to report upon the general feasibility of using the old fortifications at Fort Wadsworth, N. Y., for barracks and storehouse purposes, and to report upon what permanent fixtures will be required for military purposes at Pine Camp. Chief Engineer Officer, Department of the East and Gulf.

That is one of these officers.

Mr. HAY. How many officers did he have under him?

Colonel ABBOT. He has no military assistants.

Mr. PRINCE. How many civilian engineers are there under his employ?

Colonel ABBOT. That I could not say offhand, but we can give that when we get back to the office. [NOTE.—Five assistant engineers and 8 junior engineers.]

Mr. PRINCE. Is not that very statement so near being ridiculous that no man could do the work assigned to him under that assignment?

Mr. TILSON. Yes; it is almost equivalent to saying that that man is loafing, because he could not cover the work.

The CHAIRMAN. General, have you ever taken any civilian candidates into the corps? I see section 3 provides for the appointment of civilians in the corps. Have you ever appointed any civilians? As a matter of fact, do civilians ever come into the corps?

General MACKENZIE. My recollection is, Mr. Hull, that General Fremont was the only one.

The CHAIRMAN. Of course, that was a long time ago. I am talking about the last forty or fifty years. At one time in the Government they had almost all the branches filled by civilians, before West Point was started.

General MACKENZIE. This is not of that character. It simply authorizes the appointment of civilian engineers, when required.

The CHAIRMAN. I had the impression that that did not really mean much, and I do not think it ought to, as a matter of fact.

General MACKENZIE. This is what it means, as I understand it: If at any time West Point can not furnish enough to fill up——

The CHAIRMAN. Section 4, Colonel, provides——

That whenever it shall be necessary, in order to properly prosecute works of river and harbor improvement, the Chief of Engineers is authorized to detail for duty in charge of river and harbor districts, or as members of boards of engineers any assistant engineers in the employ of the Engineer Bureau of the War Department.

Could not a great deal of that be done, or would it be feasible?

Colonel ABBOT. You mean at the present time?

The CHAIRMAN. Yes; at the present time do you not have a corps of civil engineers?

Colonel ABBOT. We do utilize the advice and knowledge of our assistant engineers very frequently. This would make it a little clearer, as to exactly what the powers of the Chief of Engineers are in that line.

The CHAIRMAN. It would authorize you to detail them for duty in charge, in place of simply as subordinates, would it not?

Colonel ABBOT. Yes, sir.

The CHAIRMAN. And you have more civil engineers under your employ than you have regular members of the corps, have you not?

Colonel ABBOT. More than we have regular members of the corps on river and harbor duty.

The CHAIRMAN. Now, under section 5, is it feasible to carry the Corps of Engineers as a separate organization to be paid for out of river and harbor work—civilian employees out of the work practically, out of the appropriation for rivers and harbors, and those officers performing military duties from appropriations made by the army? Would that lead to any confusion or not?

Colonel ABBOT. I do not think so, in the way section 5 is worded.

Mr. STEVENS. Colonel, you may not be as familiar as General Mackenzie is with this proposition of constructing dams in navigable streams. Undoubtedly legislation will be had at this session providing for the construction of dams in navigable streams, giving the Corps of Engineers very large authority for their construction, and providing that the United States shall be reimbursed by the concern that constructs the dam for all possible expenses, including inspection, investigation of streams, location of the dams, and supervision of the dams afterwards, and possibly their removal at any time, and pro-

viding that the concern that makes such improvements shall pay into the Treasury sufficient for that purpose. Now could any estimate be made so that the portion of the compensation of the officer doing that work can be defrayed out of that fund?

Colonel ABBOT. It would be extremely difficult to do that with officers having so many different classes of duties in their charge as we are compelled to have under the present conditions. If a man had light-house duty and fortification duty and river and harbor duty, and supervision of certain dams it would be hard to tell how much of his time was absolutely chargeable in money to any one of those items. But section 5 says that when on duty under the Chief of Engineers, connected solely with the work of river and harbor improvement, then there is no question about knowing whether that officer had other duties than those connected with the river and harbor or not. Those who are doing solely river and harbor duty would come under section 5; those only. But when it comes to divide up an officer who has several different classes of work, I do not think it would be practicable to pay part of his compensation from the army and part of his same compensation from other sources.

Mr. STEVENS. But an arrangement might be made so that the United States might be reimbursed, and a sum covered into the Treasury sufficient to pay for the portion of his time?

Colonel ABBOT. Certainly; the United States could be reimbursed.

Mr. STEVENS. The difficulty would be that it would not apply in reducing the legitimate military expenses of the Government?

Colonel ABBOT. No; it would not show, but the Government would be reimbursed to that extent.

Mr. HAY. Colonel, how many different river and harbor projects are now under actual construction throughout the country?

Colonel ABBOT. In the statement of January 20, 1910, there are 791 different individual river and harbor improvements listed.

Mr. HAY. I mean how many of them are actually under way?

Colonel ABBOT. They are actually going on, or surveys in connection with them.

Mr. YOUNG. Some of those are only matters of maintenance, perhaps, but they all have to be looked after?

Colonel ABBOT. They all have to be looked after.

Mr. HAY. How many could be coordinated?

Colonel ABBOT. We now have as many of them coordinated as we can and still have one man in control. Out of the river and harbor districts which formerly existed we have now 18 combined districts. By that I mean we now have only one district where there were two or more former individual districts, which have been combined under one officer in the effort to make our officers spread out farther, and there is not one of those cases where it would not be advantageous to separate the combination into the original districts, if we had officers that we could assign to them.

Mr. HAY. How many men have you in the corps? I suppose the question has been asked already.

Mr. YOUNG. One hundred and eighty-eight.

Colonel ABBOT. Yes, by law; but actually only 178 men at present.

Mr. YOUNG. This bill adds sixty—

Colonel ABBOT. Yes, in five years' time.

Mr. STEVENS. I think it is important to ascertain the character of the work that these officials have to do. Now, for example, on the

New England coast how many districts have you from the eastern coast of Maine to New York?

Colonel ABBOT. There is Portland. Portsmouth was formerly an individual district, but it is now run by the Portland office. There is Boston. Then there is the Newport office, and an office at New London, and one at New York.

Mr. STEVENS. There are four, then, on the New England coast?

Colonel ABBOT. Yes, sir, at present.

Mr. STEVENS. What duties, then, have they in addition to river and harbor work?

Colonel ABBOT. They have fortification construction in every one. Some of them have light-house duties, and——

Mr. HAY. What are their light-house duties?

Colonel ABBOT. Two of them have light-house duties. Then, in the New London office they have a purchasing agency for issuing searchlights and electric generating sets for all of the fortifications in the United States. It is a difficult piece of work and adds nearly as much labor and correspondence to Colonel Taylor as his whole river and harbor district.

Mr. STEVENS. Now, is the character of the work on the New England coast at all difficult from the fortification point of view?

Colonel ABBOT. Some of it is very difficult, and some of it comparatively easy. It varies.

Mr. STEVENS. What do you try to do as to the grading of officers in those different stations?

Colonel ABBOT. All of those stations at the present time are occupied by lieutenant-colonels.

Mr. STEVENS. Could not some of them be filled by officers of a lower grade?

Colonel ABBOT. They have been in the past.

Mr. STEVENS. It could be done in the future, could it not?

Colonel ABBOT. It could be done in the future, but where there is a very large amount of work going on of a difficult character it is advisable to have an officer of age and experience.

Mr. STEVENS. We all realize that, but what I was trying to get at was how many of these difficult stations there are on the New England coast and on the Middle Atlantic coast and on the rivers and lakes. Now, just please tell us the very difficult stations, like those at Boston and New York, on the southern coast and on the Lakes and on the lower Mississippi. What are the very difficult stations, and what do the officers have to do?

Colonel ABBOT. General Mackenzie, you could answer that as to the river and harbor work better than I could. I have only a general knowledge of the river and harbor business, as my desk is the fortification one in the office of the Chief of Engineers.

Mr. PRINCE. Colonel, did you say anything about some of the officers in the Engineer Corps being connected with duty pertaining to monuments of any kind?

Colonel ABBOT. Yes, sir.

Mr. PRINCE. What was that?

Colonel ABBOT. A number of them have been assigned by law to the Corps of Engineers. For instance, General Marshall at one time was in charge of the erection of the Prison Ship Martyrs' Monument in New York, which was a difficult duty, assigned to him by a law

authorizing a board of which the Secretary of War, the governor of New York, the mayor of New York City, and an officer of the Engineer Corps were to be members.

Mr. SLAYDEN. Did the Engineer Corps design the monument?

Colonel ABBOT. They supervised the architects in designing that monument, and the board approved the final plans.

Mr. SLAYDEN. What do you mean by "supervised the architects?"

Colonel ABBOT. If the architect put in a plan that would evidently cost more than the sum appropriated, the engineer officer would say, "That is impossible," and insist on changes to reduce the cost.

Mr. SLAYDEN. What were those architects? Were they from the profession at large, who were invited to bid competitively in designing?

Colonel ABBOT. I am not sure of that particular case.

Mr. SLAYDEN. Is not that usually the case.

Colonel ABBOT. Yes; generally.

The CHAIRMAN. You say all these districts on the Atlantic coast have fortifications and river and harbor work?

Colonel ABBOT. Yes, sir.

The CHAIRMAN. Your section 5 provides—

That the officers of the Corps of Engineers, when on duty under the Chief of Engineers connected solely with the work of river and harbor improvements, may, while so employed, be paid their pay and commutation of quarters from the appropriations for the work or works upon which they are employed.

In a case where they are on fortifications and also on river and harbor work, that would not affect their pay out of the river and harbor bill? In other words, they would still be paid out of the army bill?

Colonel ABBOT. Yes.

The CHAIRMAN. Where would their pay be affected—in the interior only?

Colonel ABBOT. It would be about \$100,000 to \$125,000 reduction, we estimated, in the annual cost to the army bill after this increase went through, provided section 5 became a law. There would be about \$350,000, as I recollect the figure, of the cost of the Corps of Engineers at that time to be paid from the river and harbor appropriation. The total increase of cost would be about \$250,000, so that the saving to the army bill would be the difference between \$350,000 and \$250,000 or approximately \$100,000; probably a little more rather than a little less saving to that bill.

Mr. HAY. What difference does it make to the Government whether you pay them out of the army bill or out of the river and harbor bill?

Mr. SLAYDEN. Or to the taxpayers?

Colonel ABBOT. It makes no difference. I was answering the question as I understood Mr. Hull to ask it.

The CHAIRMAN. Of course it makes no difference to the Treasury in the amount, but it makes a material difference as to what is called "military expenses." At the end of the hearing I will insert a letter received by me from General Marshall, so that the committee will have it. In that letter he sets out the amount of additional cost which this increase would involve to the Government.

Colonel ABBOT. It is about \$250,000 for pay proper, to which there should be added the cost of fuel and light.

The CHAIRMAN. That is, the pay proper——

Colonel ABBOT. Is about \$250,000, including commutation of quarters.

The CHAIRMAN. That includes the commutation of quarters? That \$250,000 includes that?

Colonel ABBOT. Yes, sir; and they would be paid from the river and harbor bill \$350,000 in approximate figures, leaving a reduction in the army bill of \$100,000.

Mr. PRINCE. Colonel, how many assistant engineers are there now in the employ of the engineer bureau of the War Department?

Colonel ABBOT. There were 202 individual civilian engineers employed on river and harbor works for part or all of the year from July 1, 1908, to June 30, 1909. [See H. Doc. No. 558, 61st Cong., 2d sess.]

Mr. PRINCE. How many in the Engineer Corps?

Colonel ABBOT. One hundred and eighty-eight.

Mr. PRINCE. In the military Engineer Corps proper?

Colonel ABBOT. Yes, sir.

Mr. PRINCE. And the number of assistant engineers in the employ of the engineer bureau of the War Department is 202? Those are civil employees?

Colonel ABBOT. Yes, sir; those are civil employees.

Mr. PRINCE. Of that number how many have you now at work in connection with river and harbor improvements?

Colonel ABBOT. We would have to put it in the hearing afterward.

[NOTE.—Practically the same as stated above.]

Mr. PRINCE. How many would be in charge? Section 4 of the bill says:

That whenever it shall be necessary, in order to properly prosecute works of river and harbor improvement, the Chief of Engineers is authorized to detail for duty in charge of river and harbor districts or as members of boards of engineers any assistant engineers in the employ of the Engineer Bureau of the War Department.

As matters now stand without this legislation how many, if any, have you in charge as contemplated by section 4?

Colonel ABBOT. None.

Mr. PRINCE. Now, if you had section 4 as a provision alone giving you authority to employ these men, how many could you employ in that way?

General MACKENZIE. I should say very few, Mr. Prince. As I understand that section, I would be perfectly free to say that that section is not, as I understand it, with any thought of changing the present superintendence of work. It was simply for a case of emergency and for the time being that the Chief of Engineers might be authorized to do this.

Mr. PRINCE. Then it is more suggestive than a working plan to put in operation now?

General MACKENZIE. It would be a working plan, with the plain statement that I make. It is the intention to put an assistant engineer in charge of districts if the proper conditions should arise. I have some in mind now, and I think General Marshall has. It is only a few cases.

The CHAIRMAN. Right on that line, General, of course you know, no doubt, that the civil engineers would like to have a larger authority in the river and harbor work, and I think that some of them protest against certain present conditions, and I would like to hear from

you on that just in connection with what you said. Some of them protest against engineers of long experience being put under junior officers in charge of the work. As I understand it, the idea is to get permanent and positive authority of law in some way so that they can be put in charge in place of being put under a first lieutenant, say. I would like you to give your views as to the feasibility of any such law as that.

General MACKENZIE. Of course, voicing to a large extent General Marshall's sentiment in the matter, inasmuch as he is the one to speak in such matters, as I said before, he is free to state that so long as Congress in its wisdom assigns this work to the Corps of Engineers and to his responsibility, so far as may be in his power, he would naturally prefer to place his officers in charge of districts.

Mr. YOUNG. Right there, General, in answer to the chairman's suggestion, are there any cases where either first or second lieutenants are in charge of districts?

General MACKENZIE. The only case at present is Lieutenant Leeds, at Los Angeles.

Colonel ABBOT. He was stationed at Los Angeles because he had an incipient case of tuberculosis, and that climate was suited to his case. He was sent there as assistant. The officer who was in charge of the district had served his time and was required elsewhere, and that left Lieutenant Leeds in Los Angeles, and we have not been able to get our hands on any officer at the present time of higher rank to command that district. But incidentally I would like to say I understand his relationship with his assistant engineers is absolutely pleasant.

The CHAIRMAN. I am glad to have your views on that, because my understanding is—I may be wrong in my conclusion—that the civilian in charge feels that he ought to have a larger power in this work, and I had the impression that if it was put under the control of civil engineers, the engineers would like to have entire control of their direction.

General MACKENZIE. I may say, concerning Mr. Noble, who is present, that we worked side by side as assistants in the Detroit office, and I would say I have a very large acquaintance with the assistant engineers in the country—probably as large as anybody in the country—I know them well, and we are all friends, and I am very fond of them, and I think they are fond of me; but at the same time there is not and never has been, so far as I know, more than one or two cases such as you refer to, where a comparatively young man was by some accident thrown into a district. That has always occurred from a shortage, or something of that kind—the impossibility of getting an officer of more experience.

Mr. SLAYDEN. You mean, General, where a young man of comparatively little experience has been put over a civil engineer of larger experience?

General MACKENZIE. No; I do not express it that way; a younger man, and perhaps not so long in the service; but, of course, there is experience of different kinds, you know. But, as in this case that I speak of, there may have been a few of these cases where the assistant engineers felt a little aggrieved. But I say those were simply due to accidents, and that with this increase, which will permit the placing of these younger officers as assistants, that element will be entirely done away with.

Mr. SLAYDEN. Have we any good engineering schools in this country aside from the Military Academy?

General MACKENZIE. Oh, yes; a number.

Mr. SLAYDEN. What are they, for example?

General MACKENZIE. We have the Massachusetts Institute of Technology, at Boston, and the Troy Polytechnic Institute—

Mr. SLAYDEN. Do not those schools graduate gentlemen who have capacity for that sort of work?

General MACKENZIE. They graduate men who certainly have capacity for engineering work.

Mr. SLAYDEN. Men capable of handling intricate engineering problems after they have had the experience, of course? I fancy no graduate is capable at first.

General MACKENZIE. Certainly not; and of course there is, Mr. Slayden, in this matter of superintendence of work, a number of qualifications outside of what you might call engineering capacity. Of course that is necessary. But there is the matter of organization and administration, and one of the successes, of course, which is claimed to have come from the supervision of these works by the Corps of Engineers is due to their early training and their training through their entire life.

Mr. SLAYDEN. You mean, if I understand you, General, that the military training is essential for efficient engineering work?

General MACKENZIE. Well, I might say it is valuable for the superintendence or management of engineering work. I would not go to the point of saying it is essential. I think it is essential. Some might not make it as strong as that. It is what you might call the military precision of the work and the discipline that is instilled into the officers.

Mr. HAY. Well, General, railroads have large engineering problems, the building of railroads and bridges, some of them?

General MACKENZIE. Yes, sir.

Mr. HAY. They have been uniformly built by civilian engineers, have they not?

General MACKENZIE. I would say yes, although of course in the earlier days a number of them were built by engineer officers.

Mr. HAY. I mean to-day.

General MACKENZIE. Certainly. The engineering department is but a comparatively small body. Nearly nine-tenths, or ninety-nine one-hundredths of the engineering work of the country is done by men outside the Engineer Corps.

Mr. HAY. And they have to have ability to organize and have to have executive ability in addition to capacity as engineers?

General MACKENZIE. I could not answer as to that, as to how much is done by the engineers and how much by the manager or superintendent. I do not know enough of that to give you information.

Mr. SLAYDEN. General, the logic of your answer, then, would be that this engineering work done for these great corporations would be better done and more efficiently done if it were done by West Point graduates who had military training?

General MACKENZIE. I would not permit myself to say that.

Mr. SLAYDEN. It seems to me that is a fair inference.

Mr. STEVENS. Not at all.

The CHAIRMAN. If I understand your position—if I am not correct you can correct me—your position is that this being a work under

that corps, in order to retain absolute control of it all the time the corps ought to have charge of the different divisions, and so long as it is under your corps it should be under your charge. I did not understand the General to say that this work would be done better under his corps entirely.

Mr. TILSON. Mr. Chairman, is not this the fact, that if the work is going to be done by the Government, undoubtedly the very best possible way is to have it done by the Corps of Engineers?

Mr. SLAYDEN. That is a question of opinion.

Mr. TILSON. As to whether it should be done by civil engineers, that is a different matter entirely.

Mr. HAY. As I understand it, the sole reason for passing this bill is to increase the corps so as to have military engineers in charge of the river and harbor work and engineer work which they themselves call civilian work.

Mr. YOUNG. Oh, no. They do not call it civilian work.

Mr. HAY. Nonmilitary work.

Mr. STEVENS. Is not this the situation, General, that where corporations do work, the character and expense of the work is regulated by the financial conditions which are controlled by the men who make the investments through their managing officers, and that settles itself easily; but where work is of a public nature, where there is tremendous local pressure for work which ought not to be done in three cases out of four, has it not been the policy of Congress for a hundred years to have the opinions of the engineers who are able to say "No" without any possibility of any self-interest? Has not that been the policy of Congress, to have the opinions of engineers on these subjects instead of trusting to outside advice?

Colonel ABBOT. I think so.

Mr. YOUNG. What is the answer?

Colonel ABBOT. I said I think so.

Mr. TILSON. That comes back to my proposition—that if these things are going to be done by the Government at all, the best way we have ever found to do them is by utilizing the Engineer Corps to do them.

The CHAIRMAN. I would like the General to answer the question asked before we start in on the new line. You heard Mr. Stevens's question?

Mr. PRINCE. He answered.

Mr. STEVENS. We should find out what the facts are. In 1909 how many surveys were there—in the bill of 1909?

Colonel ABBOT. Two hundred and seventy-three, Major Ladue says.

Mr. STEVENS. How many have been reported on?

Colonel ABBOT. We will have to put that in the hearing. The reports are coming in all the time.

Mr. STEVENS. I would like to know how many were reported; how many were reported favorably, and how many were reported unfavorably, and how many were reported in the bill for 1907; how many reported favorably, and how many unfavorably, and what was the estimated expense of those favorably reported and those unfavorably reported on, and how many there were in the bill for 1905.

Statement of the number of preliminary examinations and surveys ordered by the river and harbor acts of 1905, 1907, and 1909, showing the number favorably reported and the number unfavorably reported, as well as the total estimated cost of improvements recommended to Congress for adoption.

Under river and harbor act of—	Total number ordered.	Examinations and surveys.		Estimated cost of improvements recommended to Congress.
		Favorable.	Unfavorable.	
1905.....	156	67	89	\$33,342,518.28
1907.....	a 183	95	83	39,440,308.04
1909.....	b 17	10	7	10,020,885.40
	277	82	115	38,113,713.34

a Under section 3.

b Under section 1.

NOTE.—Under the act of 1909, action not yet taken on 80 cases.

The cost of all works upon which unfavorable reports have been made would materially exceed the cost of those recommended, but definite data are lacking, for, when preliminary examinations are unfavorable, preparation of estimates is forbidden by law, and the unfavorable survey reports alone include estimates of cost. Under the act of 1907 unfavorable survey reports were 18 in number, and the total cost of the work covered by these surveys alone would be several times the total amount for all the projects favorably recommended. The 13 unfavorable survey reports under the act of 1909 cover projects for which the estimated cost is over \$7,000,000, and of the 102 unfavorable reports on preliminary examinations 8 or 10 of them can be selected for which the total cost would exceed that of the 82 projects favorably recommended.

The CHAIRMAN. I suggest that you put those figures in.

Mr. YOUNG. You could not find the estimated expense of those that were turned down.

Mr. STEVENS. What I am trying to get at is the character of the work that is submitted to this Corps of Engineers. Then, I asked another question which has not been answered, and I think it is of some importance, and that is, what are the stations in the United States that demand the services of an able and experienced officer, whether he be military or civilian—such stations as Boston, and New York, and Detroit, and St. Louis, and San Francisco, and—

The CHAIRMAN. Rock Island—

Mr. STEVENS. Yes; and Rock Island; how many of them there are.

Colonel ABBOT. I will put that in the hearing; a list of the most important stations, as we regard them—

Mr. STEVENS. Where you need the higher ranking officer.

Colonel ABBOT. Yes, sir.

Stations of officers of the Corps of Engineers which are considered the most important and require the services of officers of the greatest ability and experience.

Station.	Duty.
Washington, D. C.....	Chief of Engineers (1). Members of Board of Engineers for Rivers and Harbors (5). Principal assistants to the Chief of Engineers (3). Engineer Commissioner of the District of Columbia (1).
St. Louis, Mo.....	Division engineer of the western division. President of the Mississippi River Commission. In charge of the Mississippi River improvement between the mouth of the Missouri River and the mouth of the Ohio River.
New York City, N. Y.....	Division engineer of the eastern division. Member of the Board of Engineers. Member of the Mississippi River Commission. Member of the New York Harbor Line Board.
Savannah, Ga.....	In charge of river and harbor improvements in northern New Jersey. Division engineer of southeast division. Member of board to make a survey for Atlantic coast inland waterway. In charge of river and harbor improvements in the State of Georgia.

Stations of officers of the Corps of Engineers which are considered the most important and require the services of officers of the greatest ability and experience—Continued.

Station.	Duty.
New York City, N. Y.....	Division engineer of the northeast division. Member of the Board of Engineers. Chief Engineer, Department of the East. Chief Engineer, Department of the Gulf. Member of New York Harbor Line Board. In charge of improvement of Hudson River and waterways in Long Island.
Buffalo, N. Y.....	Division engineer of the Lakes division. In charge of Buffalo (N. Y.) district. Light-house engineer.
New York City, N. Y.....	Member of Board of Engineers. In charge of improvement of New York Harbor, Ambrose Channel, etc.
Baltimore, Md.....	In charge of improvement of Baltimore Harbor and waterways in Maryland. Light-house engineer.
Detroit, Mich.....	In charge of Detroit district, including St. Marys River, Lake Huron, and Detroit River.
Cleveland, Ohio.....	In charge of improvement of harbors on the south shore of Lake Erie.
San Francisco, Cal.....	Division engineer of the Pacific division. Division engineer of the Northern Pacific division. Member of California Débris Commission. In charge of improvement of waterways in California.
Cincinnati, Ohio.....	Division engineer of the central division. Member of the Mississippi River Commission. In charge of the improvement of the Ohio River. Light-house engineer.
Boston, Mass.....	In charge of river and harbor improvements and fortification duties in Massachusetts. Light-house engineer.
New Orleans, La.....	Division engineer of the Gulf division. In charge of improvement of the mouth of Mississippi River and other waterways in Louisiana.
Washington Barracks, D. C....	Commanding Engineer School and post of Washington Barracks.
Duluth, Minn.....	In charge of improvements on Lake Superior.
New London, Conn.....	In charge of river and harbor works and fortification duties on north shore of Long Island Sound.
Pittsburg, Pa.....	In charge of improvement of Allegheny and Monongahela rivers and a portion of the Ohio River.
Norfolk, Va.....	In charge of river and harbor improvements in vicinity of southwestern shore of Chesapeake Bay.
Rock Island, Ill.....	In charge of the improvement of the Mississippi River between Minneapolis and the mouth of the Missouri River.
Chicago, Ill.....	In charge of the river and harbor improvements in the vicinity of the southern end of Lake Michigan, including Chicago Harbor. Chief engineer officer, department of the Lakes.
St. Paul, Minn.....	In charge of the improvement of the upper portion of the Mississippi River and of reservoir construction and operation in Minnesota.
Mobile, Ala.....	In charge of river and harbor improvements on the Gulf coast of Mississippi and Alabama and of the improvement of the Warrior and Tombigbee River system.
Manila, P. I.....	Engineer, Seventh and Eighth Light-House Districts. Chief engineer officer, Philippines Division. In charge of all fortification construction in the Philippine Islands.
Nashville, Tenn.....	In charge of the Cumberland River and other waterway improvements. In temporary charge of the Tennessee River improvement.
Philadelphia, Pa.....	In charge of river and harbor improvements in the Delaware River.
Milwaukee, Wis.....	In charge of river and harbor improvements on the west shore of Lake Michigan. Engineer, Ninth Light-House District.
Washington, D. C.....	In charge of public buildings and grounds in the District of Columbia.
Portland, Oreg. (two districts).	In charge of fortifications at the mouth of the Columbia River: improvement of the Columbia, Willamette, and Snake rivers and coast harbors of Oregon. Engineer, Thirteenth Light-House District.
Washington, D. C.....	In charge of fortification work, river and harbor improvements, and the Washington Aqueduct and filtration plant.
Seattle, Wash.....	In charge of defensive works on Puget Sound and river and harbor improvements in the State of Washington.
Kansas City, Mo.....	In charge of the improvement of the Missouri River, chief engineer officer, Department of the Missouri.
Galveston, Tex.....	In charge of fortification works and harbor works on the Gulf coast of Texas.
Wheeling, W. Va.....	In charge of improvement of a portion of the Ohio River and the Great Kanawha and other rivers.
Jacksonville, Fla.....	In charge of fortification and river and harbor works in the State of Florida.

The above table is made out as a result of a general view of the situation in the Corps of Engineers without including the officers on duty in connection with the Panama Canal. It is practically impossible to clearly differentiate between the various offices, because some of them which are more important for certain reasons are less important for others. For this reason I will furnish herewith the following information.

The following tables show the disbursements made at the various engineer offices in the fiscal years 1908 and 1909. Whereas in 1908 \$32,682,652.45 was disbursed at 72 offices, in 1909 \$41,755,741.28 was disbursed at only 67 offices. Although the amount disbursed increased by approximately \$9,073,088.83, the number of disbursing officers decreased by 5, due to the necessity of assigning them to other duties which had come up and demanded their supervision.

Disbursements by officers of the Corps of Engineers, U. S. Army, during the fiscal year 1908.

No.	Stations.	Amount.
1	Detroit, Mich.	\$2,148,116.96
2	Philadelphia, Pa.	1,441,476.88
3	Pittsburg, Pa.	1,217,636.43
4	Cleveland, Ohio.	1,149,437.96
5	Portland, Oreg.	1,111,187.38
6	New Orleans, La.	1,094,349.77
7	Mobile, Ala.	1,043,253.91
8	Boston, Mass.	1,043,954.53
9	Vicksburg, Miss.	992,937.73
10	Galveston, Tex.	912,562.59
11	Memphis, Tenn.	911,343.52
12	New York City.	899,642.73
13	Baltimore, Md.	896,817.60
14	New Orleans, La.	893,532.49
15	Washington, D. C.	811,409.44
16	Rock Island, Ill.	806,830.27
17	Jacksonville, Fla.	713,215.74
18	Seattle, Wash.	706,567.96
19	Manila, P. I.	653,414.25
20	Wheeling, W. Va.	622,108.27
21	Buffalo, N. Y.	609,941.34
22	Newport, R. I.	593,074.45
23	Dallas, Tex.	583,483.48
24	St. Louis, Mo.	562,346.38
25	Savannah, Ga.	558,132.60
26	Milwaukee, Wis.	542,312.98
27	Chattanooga, Tenn.	528,895.67
28	St. Louis, Mo.	500,331.39
29	Duluth, Minn.	487,967.42
30	Montgomery, Ala.	454,643.50
31	New London, Conn.	421,416.55
32	Wilmington, N. C.	371,673.09
33	New York City.	370,721.83
34	Charleston, S. C.	362,201.02
35	Louisville, Ky.	348,272.25
36	Grand Rapids, Mich.	318,506.73
37	Los Angeles, Cal.	317,151.15
38	New York City.	316,971.26
39	Portland, Me.	304,133.63
40	Cincinnati, Ohio.	294,419.65
41	Chicago, Ill.	284,342.46
42	Washington, D. C. (public buildings and grounds).	278,374.72
43	Cincinnati, Ohio.	266,658.47
44	Chicago, Ill.	247,547.58
45	Kansas City, Mo.	238,948.95
46	Honolulu, Hawaii.	238,420.33
47	St. Paul, Minn.	236,459.37
48	San Francisco, Cal.	231,945.29
49	Washington, D. C.	221,227.28
50	Nashville, Tenn.	217,909.51
51	Wilmington, Del.	216,373.19
52	Little Rock, Ark.	208,157.91
53	Norfolk, Va.	182,537.57
54	San Francisco, Cal.	119,706.37
55	Washington Barracks, D. C.	115,884.03
56	New York Harbor, supervisor	89,315.45
57	Detroit, Mich.	81,866.16
58	Tompkinsville, N. Y.	73,491.68
59	San Francisco, Cal.	61,946.54
60	Yellowstone Park, Wyo.	55,968.91
61	Buffalo, N. Y.	19,455.96
62	Guantanamo, Cuba.	13,102.12
63	Habana, Cuba.	11,675.99
64	New York City.	10,285.69
65	Manila, P. I.	8,537.37
66	Fort Leavenworth, Kans.	7,024.12
67	New York City.	5,841.98
68	Skagway, Alaska.	3,182.06
69	Chicago, Ill.	1,975.00
70	Denver, Colo.	1,830.00
71	Fort Mason, Cal.	1,200.00
72	St. Paul, Minn.	1,067.02
Total.....		32,682,652.45

Disbursements by officers of the Corps of Engineers, U. S. Army, during the fiscal year 1909.

No.	Stations.	Amount.
1	Detroit, Mich. (Colonel Townsend).....	\$3,535,797.77
2	Mobile, Ala.....	1,786,349.12
3	Philadelphia, Pa.....	1,645,844.90
4	Galveston, Tex.....	1,590,913.59
5	Boston, Mass.....	1,552,008.06
6	Portland, Oreg.....	1,533,589.22
7	Wheeling, W. Va.....	1,441,545.87
8	Buffalo, N. Y.....	1,243,490.37
9	Vicksburg, Miss.....	1,208,922.89
10	New York, N. Y. (District No. 2).....	1,041,357.74
11	Manila, P. I. (Major Howell).....	1,037,407.08
12	Pittsburg, Pa.....	990,840.79
13	Baltimore, Md.....	983,670.45
14	New Orleans, La. (Lieutenant-Colonel Beach).....	945,022.52
15	Memphis, Tenn.....	904,610.06
16	Cleveland, Ohio.....	890,052.11
17	Milwaukee, Wis.....	863,599.19
18	New Orleans, La. (Captain Burgess).....	859,541.20
19	Honolulu, Hawaii.....	802,444.43
20	Savannah, Ga.....	713,064.49
21	Jacksonville, Fla.....	759,333.53
22	Rock Island, Ill.....	751,648.62
23	Washington, D. C. (Major Morrow).....	738,904.86
24	Newport, R. I.....	712,242.51
25	Seattle, Wash.....	677,024.47
26	Cincinnati, Ohio (District No. 1).....	655,453.03
27	Cincinnati, Ohio (District No. 2).....	653,297.84
28	Duluth, Minn.....	620,924.10
29	Montgomery, Ala.....	609,093.87
30	Chattanooga, Tenn.....	569,912.69
31	Dallas, Tex.....	525,061.14
32	St. Louis, Mo. (Mississippi River Commission office).....	502,164.24
33	Chicago, Ill. (Major Rees).....	499,294.40
34	New York, N. Y. (District No. 1).....	496,551.40
35	Washington, D. C. (Colonel Cosby).....	497,075.39
36	New London, Conn.....	466,420.12
37	St. Louis, Mo. (Colonel Bixby).....	441,845.47
38	San Francisco, Cal. (Lieutenant-Colonel Biddle).....	441,218.63
39	Wilmington, N. C.....	410,962.62
40	Grand Rapids, Mich.....	371,694.07
41	New York, N. Y. (District No. 3).....	361,900.04
42	Charleston, S. C.....	361,036.68
43	Norfolk, Va.....	352,861.64
44	Louisville, Ky.....	349,190.70
45	St. Paul, Minn.....	337,219.58
46	Portland, Me.....	303,448.88
47	Los Angeles, Cal.....	302,311.04
48	Nashville, Tenn.....	299,815.73
49	Chicago, Ill. (Major Riche).....	283,846.04
50	Kansas City, Mo.....	271,842.09
51	Tompkinsville, N. Y.....	241,446.10
52	Little Rock, Ark.....	195,397.17
53	San Francisco, Cal. (Major McKinstry).....	187,390.68
54	Detroit, Mich. (Major Keller).....	129,724.18
55	Washington Barracks, D. C.....	112,862.12
56	San Francisco, Cal. (Captain Jackson).....	86,028.70
57	New York, N. Y. (supervisor of the harbor).....	85,706.17
58	Yellowstone Park, Wyo.....	60,936.12
59	Washington, D. C. (Office Chief of Engineers).....	60,907.56
60	Buffalo, N. Y. (International Waterways Commission).....	22,255.71
61	Manila, P. I. (Captain Stuart).....	14,104.07
62	New York, N. Y. (Board of Engineers).....	10,026.83
63	Fort Leavenworth, Kans.....	7,399.00
64	Vancouver Barracks, Wash.....	1,670.28
65	Denver, Colo. (Department of Colorado).....	1,500.00
66	Fort Mason, Cal.....	400.00
67	Wilmington, Del.....	225,442.83
Total.....		41,755,741.28

The above abstracts of disbursements indicate to a certain extent the relative importance of various stations. However, the tables are not conclusive, because the duties of many officers who make no disbursements whatsoever are often more important and require officers of more ability and experience than when the disbursements are large.

A few examples of important duties requiring no disbursements are shown in the following table:

Position.	Disbursements.	Remarks.
The Chief of Engineers.....	None.....	In charge of the Engineer Department, etc.
President Mississippi River Commission.....	do.....	The commission has charge of all work on the Mississippi River between Cairo and the Gulf of Mexico.
Seven division engineers.....	do.....	General supervision of all work in the engineer districts in their divisions.
Five members of the Board of Engineers for Rivers and Harbors.....	do.....	This board passes on the plans for, and advisability of undertaking, all projects ordered by Congress to be examined.
Four assistants to the Chief of Engineers.....	do.....	These officers have important duties in connection with all river and harbor work, fortifications, etc., undertaken by the Government.
Nine officers with Canal Commission.....	do.....	Constructing Panama Canal.
Chief engineer officer, Division of the Philippines.....	do.....	In charge of all engineer work and fortifications in the Philippine Islands.
Engineer Commissioner, District of Columbia.....	do.....	Member of Board of Commissioners of District of Columbia.
Three instructors at the engineer school.....	do.....	In charge of instruction of all student engineer officers.

In many districts where disbursements are made, but where the disbursements are comparatively small because of a comparatively small amount of construction work being done by the Government, the requirements of the office in the branches of the work assigned to the Corps of Engineers other than construction and disbursing are such as to require the services of an able and experienced officer.

The duties above referred to, as being additional to that of construction, include the following:

Temporary duty with the National Waterways Commission.

Membership of Mississippi River Commission. (Two officers in addition to the president of the commission.)

Members of boards for examination of officers for promotion.

Membership on the New York Harbor Line Board, San Francisco Harbor Line Board, and other harbor line boards.

Membership on boards to report upon various large projects ordered by Congress to be examined, such as the board for examination of the Mississippi River, the board for surveying the Ohio River, the three boards for examination of the Atlantic and Gulf intracoastal waterways, etc.

Membership of the Board of Engineers (for fortifications).

Membership of board to prepare plans for land defense of fortifications.

Chief engineer officers of various military departments.

Membership of the Ordnance Board.

Duty as engineers of 16 light-house districts.

Membership on various boards to report upon the obstructive features of certain bridges crossing navigable waters.

Membership on the California Débris Commission to regulate hydraulic mining in the State of California.

Membership of boards to pass upon new bridges to be built across the Ohio and other rivers.

The making of preliminary examinations and surveys ordered by Congress as preliminary to commencement of new works of improvement.

At present practically all of the duties above mentioned are performed by officers who have also to supervise government construction work and make disbursements.

Mr. PRINCE. On page 2, beginning at line 6, a proviso—

That vacancies which can not be filled in any calendar year by the promotion of such cadets may be filled by transfer of officers from the army at large, under such regulations as to the examination and selection as may be recommended by the Chief of Engineers and approved by the Secretary of War, or from civil life, as hereinafter provided.

Is not that thought large enough to fill all the vacancies that you can not fill by the corps of cadets—by promotion from the corps of cadets at the academy?

General MACKENZIE. That provision, Mr. Prince, is simply to transfer second lieutenants, and I do not know that any would be transferred under it. I doubt whether they would. Of course as to the transfer from the army at large, I imagine there would not be many who would care for that under the restrictions that would be necessary.

Mr. PRINCE. Do you think enough officers would be transferred from the army at large to fill the vacancies in the Corps of Engineers? Is it not the Corps of Engineers that is most sought after of any of the corps of the army?

General MACKENZIE. I do not know whether I could answer. It might be with cadets. I do not know that it is after they have reached the army.

Mr. PRINCE. Are you limited as to the number of cadets that you could take to fill this corps?

General MACKENZIE. We are, under the law and custom as that stands to day.

Mr. PRINCE. How many? You begin at number one; how far can you go?

General MACKENZIE. We go as far as the academic board will recommend.

Mr. SLAYDEN. That is not law; that is a regulation.

Mr. PRINCE. Suppose at the present time when a class graduates you have 20 vacancies in the second lieutenants in the Corps of Engineers. Is there anything that would forbid you from getting 20 cadets out of a class of 100, if they wanted to go into the Engineer Corps?

Mr. SLAYDEN. If they are qualified?

Mr. PRINCE. The man that stands at the head is qualified now. He gets into the Engineer Corps, and I take it for granted that he must be a good officer, although he may be a bookworm. Can you not from that source alone fill all the vacancies?

General MACKENZIE. Yes; I think we can.

Mr. PRINCE. Then what does that other section 3 amount to? Is it anything more or less than words?

General MACKENZIE. It was not intended as mere words. I question, though, whether there would be any transfers.

Mr. PRINCE. As I understand it, you have two sources. First, you could take all the class graduates at West Point, if necessary, to fill the vacancies, and if you have not enough there you can go to the army at large, and if not enough there you can come to the civilians. Now, is not the civilian so far postponed that he is not in it at all?

General MACKENZIE. I can assure you from the Chief of Engineers that he would not have the slightest hesitation to have the portion relating to transfers stricken out.

Mr. PRINCE. I think it ought to be stricken out. I do not think we should hold out an inducement like that.

General BELL. There is another side to that question. I will present it later if I may.

Mr. PRINCE. I would not change the system as it is drawn, because you have had years of experience, and it is a wise one, and I do not think Congress ought to hold out a false light when they know there is no prospect. We ought to be frank and fair in legislation. Now, if there is another side, as General Bell indicates, that gives an open door, then well and good.

Mr. STEVENS. General, what has been the experience? Is it that every man who graduates at the head of the class or within 10 or 15 numbers of the head of the class would be qualified to be a good engineer?

General MACKENZIE. There is a difference in characteristics. The majority, of course, are very excellent, superior men. Some will do better than others.

Mr. STEVENS. Is it an invariable rule?

General MACKENZIE. I would not absolutely say it is an invariable rule.

Mr. PRINCE. It is the safest way to fill it.

General MACKENZIE. You were speaking more of the top man, as I understood.

Mr. STEVENS. Would you not find some who have graduated at the lower grades who nevertheless would make first-class engineers?

General MACKENZIE. Yes; within the limits of those recommended by the academic board.

The CHAIRMAN. Those who graduate at a low grade in their class never get into the engineers.

Mr. STEVENS. This would give them an opportunity, under section 2.

General MACKENZIE. I would say in regard to those transfers, that they are to be made under such regulations and examinations as might be prescribed. They would be as thorough as the examination at West Point.

Mr. STEVENS. That is, you fix the standard and require that all applicants should come to that standard, and if they do you can fill them in that way?

General MACKENZIE. The transfer clause furnishes one method of securing additional officers, but I should not anticipate securing many under that clause, and there is no objection to its omission if there is any objection to it.

Mr. STEVENS. As Colonel Abbot stated, there are three officers connected with the District government and one with the aqueduct, and then one with the office of Superintendent of Public Buildings and another one as superintendent of the State, War and Navy building?

Colonel ABBOT. Yes, sir.

Mr. STEVENS. Do those officers when performing that service have different rank and pay from what they would receive if they were doing their work in the regular line of duty?

Colonel ABBOT. The Superintendent of Public Buildings and Grounds has ex officio the rank and pay of a colonel, and the District engineer commissioner has a specified pay which is slightly different from his army pay. Now, in the case of Major Judson it is a question of about \$150 a year, I think. That is the only difference.

Mr. STEVENS. I know the major did not want to come. He told me so.

Now, from your experience, General Mackenzie, does it impair the efficiency of the officer any to come here as Superintendent of Public Buildings and Grounds with the advance to colonel, and after doing that to go back to his regular duties, wherever he may be sent? Does it hurt him any?

General MACKENZIE. My own personal opinion is that it does. I have never been in favor of this additional rank for a certain position.

Mr. STEVENS. And then send him back to a lower grade?

General MACKENZIE. It is apt to have an effect.

Mr. SLAYDEN. Does it not take him for the time being out of the active practice of his profession as an engineer?

General MACKENZIE. Of course, the officer in charge of public buildings and grounds is doing engineer work. He has a great many buildings under his charge, and has to keep them in good condition.

The CHAIRMAN. I see he has charge of the parks also.

General MACKENZIE. Yes; he has charge of the parks, and he has charge of road construction, so that he has a great deal of actual engineering work to do.

Mr. PRINCE. Can you think of any officers that are now employed in the different branches that could be taken from those places and put into the Engineer Corps proper?

General MACKENZIE. I do not personally know of any, Mr. Prince. There are none that I know of that would come in under this lower grade.

Mr. PRINCE. Did you not name somebody—I do not know who it is—that is a superintendent of a public building here, the State, War, and Navy building? Is that an engineering position? Is an engineer needed for that purpose?

General MACKENZIE. The law provides for it. The law requires that the superintendent of the building shall be an engineer officer of the army or navy, and they are claiming now that there are no engineering officers of the navy.

Mr. PRINCE. That is an act of Congress?

General MACKENZIE. That is an act of Congress.

Mr. PRINCE. Then, there is no further question about that.

Mr. YOUNG. What do you say, General, from your experience in the army, as to the value of river and harbor work, work of that kind, to the Engineer Corps as a training for strictly military duties? What value, if any, does it have?

General MACKENZIE. I consider it of inestimable value for that purpose. In fact, it is the only government work that I know of really on which engineer officers can be trained in times of peace; that is, practical training on the work which is assimilated very closely to their engineering construction work in time of war.

Mr. YOUNG. Then, by employing engineers upon this work we save the expense of civil engineers and also fit this Engineer Corps for their life work?

General MACKENZIE. Yes, sir. It is exactly that.

Mr. YOUNG. Now, some criticism was made as to the list of duties which Colonel Black, for instance, was performing. I shall ask whether these men in charge of districts are chiefly engaged in administrative work?

General MACKENZIE. They have many administrative duties. They also are responsible for the engineering work, and for the plans and details, and in fact all the responsibility rests on their shoulders.

Mr. YOUNG. And take a district of that kind on the Atlantic coast. There are many of those works which are completed and only require maintenance, but that requires constant attention from somebody and supervision?

General MACKENZIE. Certainly it does.

Mr. YOUNG. Now, previous to the Spanish war—suppose we go back to 1897—how would the number of officers then engaged in river and harbor work compare with those now engaged in that work?

General MACKENZIE. The conditions have changed. The work has been increasing all the time, with the prospect of still greater increase, and the number of officers on river and harbor work has necessarily grown relatively less, and the districts have increased in size and responsibility.

Mr. YOUNG. We have a table here prepared by the Chief of Engineers which shows that in 1897 the total number employed on river and harbor work was 71, and it is now 86. Is that correct or not?

General MACKENZIE. That is as correct as the office can make it.

Mr. YOUNG. And how does the amount of work which is now provided by the laws of Congress, passed in the last few years, compare with the amount of work of that kind which was done in 1897?

General MACKENZIE. It is very much greater now.

Mr. YOUNG. When was it that the enlisted force of the Engineer Corps was increased from one battalion to three?

General MACKENZIE. In 1901.

Mr. YOUNG. That required how many officers in addition?

General BELL. Forty-five.

Colonel ABBOT. Forty-five officers.

General MACKENZIE. That was an increase at that time to three battalions. We had but one before.

Mr. YOUNG. Now, I want to ask you a general question from your experience with the Engineer Corps and your knowledge of the work which is being done now, as to the necessity of an increase in this corps as provided for in this bill.

General MACKENZIE. I believe if the work is to remain in the hands of the Corps of Engineers, as heretofore, the increase is absolutely imperative, and that if they can not have the increase to do the work I think the view of the Chief of Engineers is that he would rather give it all up.

Mr. STEVENS. That is for Congress to say.

General MACKENZIE. I mean that is his feeling within himself; that is, that he can not do it as he would like to have it done.

Colonel ABBOT. He does not want to do it wrong. That is the trouble. He does not want to be responsible for more than he can do well.

Mr. YOUNG. Now, let me call your attention to some provisions of this bill. Some criticism may be made on the ground that we are increasing too much in the higher grades. Now, I would like to have a statement from you as to the necessity of this increase in the higher grades, and how promotion will be in the corps if it becomes a law, and how long, for instance, it will take a man to attain the grade of captain under this law, and so on.

General MACKENZIE. Of course, it is understood that the different grades in any corps regulate promotions. That is, there must be in any corps a certain promotion, a certain thought that in the course of time some one may do a little better for himself; it will be remembered that the bill which Mr. Young introduced at the last session of Congress was a little different from this bill. That is, the number of officers in the higher grades was a little larger than in this bill, although still very much less in proportion than the organization which the corps had from its organization up to 1898. At that time the thought being expressed that those numbers were a little large, they were

reduced in this bill. As I said, the ratios of the higher grades, say of the colonels and lieutenant-colonels, in this bill are identical with the organization of the Ordnance Department. That is, they are obtained simply by taking the total number in the ordnance, the total number in the proposed engineers, without second lieutenants, getting the multiplier and applying it to the number in the ordnance in those two grades, and that gives the figures in the Young bill.

Mr. YOUNG. In the other bill?

General MACKENZIE. No; in this bill. That is, the colonels and lieutenant-colonels.

The CHAIRMAN. Just one minute, so as to make this clear. Can you make a comparison between figures where they all come by promotion from the corps, with the detail corps where promotions come from the line?

General MACKENZIE. I can find no difference. It is simply a name: that—

The CHAIRMAN. Let me give you an illustration, in order to explain. Say there is a colonel of ordnance. When the permanent corps of the ordnance is worked out, there can be no colonel of the ordnance proper, but he has got to be a colonel of the line, and the same with the lieutenant-colonel of the line before he can be a lieutenant-colonel of ordnance. How do you make that comparison?

General MACKENZIE. When serving as lieutenant-colonel of ordnance he can be detailed to a colonelcy.

Mr. YOUNG. You mean a lieutenant-colonel of the line?

General MACKENZIE. I say he is to all intents and purposes temporarily a lieutenant-colonel of ordnance. I take it for granted that when a vacancy occurs in the colonelcy it will be filled by detail of a lieutenant-colonel.

Colonel ABBOT. He can be detailed from the Ordnance Department or the line. They would naturally be from the Ordnance Department, of trained men whom they know, and, being a lieutenant-colonel, he is capable of being detailed as a colonel of ordnance.

The CHAIRMAN. My understanding of the law is that that applies only to the lower grades of the Ordnance Department. For instance, a first lieutenant may be detailed as captain and serve as captain, although he is only a first lieutenant.

General MACKENZIE. As soon as he gets his captaincy he is eligible to be a major. As I say, after they become field officers they will be to all intents and purposes permanent. One purpose of the detail system is to return officers to the troops once in four years. The engineers have their own troops, and they will return in the same way and have service with the troops.

General BELL. Mr. Chairman, may I give you some information? The detail with the increased rate runs all the way through the Ordnance Department. That is the only department in which that law applies. There has been a captain recently detailed as a major, to my personal knowledge, and I am pretty sure it goes above the grade of major. I think it does.

Mr. STEVENS. Who detaches your engineer officer to serve at Yellowstone Park?

Colonel ABBOT. The Chief of Engineers. He recommends it, and it is done by the Secretary of War.

Mr. STEVENS. The Secretary does it?

Colonel ABBOT. Yes, on the recommendation of the Chief of Engineers.

Mr. STEVENS. But the Secretary of the Interior has charge of the Yellowstone Park?

Colonel ABBOT. He is detailed to report to the Secretary of the Interior.

Mr. STEVENS. Then it is at the request of the Secretary of the Interior?

Colonel ABBOT. He requests an officer, and he is assigned by the Secretary of War.

Mr. STEVENS. Have any officers of the Engineer Corps resigned to go into private employment in the last seven or eight years?

Colonel ABBOT. Yes, sir.

Mr. STEVENS. How many, and who are they, and what grades did they leave?

Colonel ABBOT. Second Lieut. Francis F. Longley, September 2, 1902; First Lieut. Edmund M. Rhett, June 4, 1903; Maj. Eugene W. Van C. Lucas, January 1, 1906; Maj. Cassius E. Gillette, March 2, 1906; Capt. Robert P. Johnston, September 17, 1906; Maj. John S. Sewell, January 31, 1908; Second Lieut. John A. Holabird, December 4, 1909; Capt. John H. Poole, to take effect March 28, 1910; acceptance recommended.

Mr. STEVENS. To go into the private practice?

Colonel ABBOT. Yes; to go into private practice; so that there are 3 majors, 2 captains, 1 first lieutenant, and 2 second lieutenants.

General MACKENZIE. In partial answer to Mr. Young's question, this is a theoretical figuring of what will happen. We will imagine the corps filled under this bill. As near as can be figured, the rate of promotion resulting from these ratios here would be to reach a captaincy in fourteen years, a majority in twenty-six years, a lieutenant-colonelcy in thirty-five years, a colonelcy in thirty-nine to forty years. That is the rate of promotion which the ratios there will furnish. Of course, whenever there are increases, there are little individual cases, like all branches of the army, where the promotions will be more rapid.

Mr. STEVENS. It does not seem to me that amounts to anything. It seems to be the work that we have got to pay for.

Mr. HAY. General, I would like to ask one question. In the event of a war with a first-class power, would the Engineer Corps provided for in this bill be large enough to meet the demands of the service?

General MACKENZIE. Of course, I know only incidentally. Perhaps General Bell could tell better. But I think the consideration of the General Staff provides for two or three times the number in this bill, and, so far as I know, the consideration that has been given their quota for a time of peace is larger than the number proposed in this bill.

Mr. HAY. If that be true, would it not be well to have civilian engineers employed upon this river and harbor work, so that they could be prepared to enter the army in the event of a war?

General MACKENZIE. Well, I do not know, sir, whether that training would be especially in the line of army work or not.

Mr. HAY. I understood you to say a while ago that the river and harbor work was the only work which the army engineers had to do which would be training for them in time of war.

General MACKENZIE. Yes, sir. Well, I meant in speaking then, of course, for the military engineering.

Mr. HAY. I understand, military engineering. The point I want to get at is whether it would not be wise to have a class of men in the country who in the event of an emergency of that sort would be able to enter the army?

General MACKENZIE. If some project of that kind could be worked up, it would be advantageous. We, of course, have given some thought to such a proposition, but find it a little difficult to work out.

The CHAIRMAN. I have a letter here from General Marshall, which I will simply put into the hearing. He goes over some of these matters which we have been discussing, and if there is no objection I will insert it in the record.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, March 7, 1910.

MY DEAR MR. HULL: In connection with our recent conversation regarding the character of certain duties devolving by law upon the Corps of Engineers, I beg to submit to you the following:

The question was in reference to the river and harbor and similar work, which is at times, in my opinion, improperly designated as civil work.

I would present the claim that such class of work, which has since the organization of this Government been made by law a part of the duties of an essentially military corps of the army, is essentially military work, and the designation "civil work" is a misnomer, arising partially, at least, from the fact that it is separated from the Regular Army estimates and provided for in appropriation acts other than that commonly designated as the act for the support of the Military Establishment.

It would appear equally proper to class as civil work that of the Subsistence Department, which buys and furnishes subsistence stores; that of the Quartermaster's Department, which builds quarters, furnishes supplies of various kinds, and mobile transportation for the army; that of the Ordnance Department, which supplies arms, powder, etc.; that of the Medical Department, or the Judge-Advocate's, or Adjutant-General's Department as it is to class as civil work the construction of harbors for our navy and for transports, and the construction of lines of water communication for the movement of army supplies and troops.

The Corps of Engineers, in peace and in war, have ever been kept at work up to their capacity on duties essential to the military strength of the United States.

It will be remembered that engineer officers not only do so-called civil engineering work, but also have at all times work with troops, military surveying, and various duties pertaining strictly to the purely military side of their profession, and in time of war have their place in the field as a part of the fighting line, which brought to the corps during the civil war the destruction of one-tenth its strength through death in battle or fatal wound.

Since remote times the construction of roads and means of transportation, harbors and canals, have been among the most essential military works.

The roads constructed by the army of Xerxes, including the pontoon bridge across the Hellespont, the Roman military roads in every part of the Roman Empire, such as the Appian Way, roads in Spain, in Gaul, and in Great Britain, and the harbor improvements at Ostia, Rhodes, London, Alexandria, Piræus, Carthage, and Tyre, etc., for the ancient fleets of Rome, Greece, Phœnicia, and Carthage, are samples of military and naval roads and river and harbor improvements, and we have all struggled with unraveling Cæsar's account of his bridge over the Rhine, and with the accounts of the road construction for the armies of Hannibal over the Alps.

The uses of our rivers during the civil war and their influence as means of transportation and communication are still fresh in our memories.

On the Atlantic seacoast, from Maine to the Rio Grande, and on the Pacific, from Bellingham Bay to Lower California, with the exception of Narragansett Bay on the Atlantic and Puget Sound on the Pacific, there are few or no harbors or channels leading thereto which in their natural or unimproved condition would allow the most modern battleships safe entrance or passage. Without the work of the military engineers of the United States, carried out under river and harbor acts, our modern fleets of battleships could not reach the naval stations, yards, and docks at Boston, New York, Norfolk, Charleston, Key West, Pensacola, or New Orleans, nor enter any important seaport on the Atlantic Ocean.

The improved channels on the Great Lakes, and rivers, such as the Hudson, Ohio, Mississippi (channel and mouth), Alabama system, etc., play an important part in the economical transportation and supply of food, fuel, and equipments for our armies and navies.

Without the river and harbor work we could have no modern navy for lack of harbor and sheltered dock yards; we could not have economical transportation for coal and naval supplies, or for military stores.

The Panama Canal, the proposed Delaware and Raritan Canal, the Delaware and Chesapeake Canal, the Albermarle and Chesapeake Canal, and the channel of the intracoastal waterway, all now under construction or survey are essentially military works.

It is the opinion of the Chief of Engineers that the Corps of Engineers should be maintained as a strictly military organization, that all its officers should be educated and trained not only in the various branches of its engineering work, but also in its so-called strictly military duties; that in its engineering work equally as well as in its purely military work great advantage comes from its discipline and military organization, from its simplicity of purpose, and independence and freedom from all purposes other than the interests of the General Government which it is serving, and further, that its officers should be at any time, in peace or war, available and eligible for any and all of the varied duties to which they may be called.

The thought here expressed carries with it the proposition that the Corps of Engineers should be reserved for those who have received a thorough education and training in their varied duties by coming in at the bottom under proper restrictions and passing through a thorough training.

This is no discrimination against the civil engineer. It will be remembered that the only work open to members of the corps is in its own limited sphere of duties, while even in the government service itself there are many positions open to civil engineers at large, such as the Geological Survey, the Coast and Geodetic Survey, the Reclamation Service, civil engineers in the navy, and in several other branches of the government departments, and beyond all this the vast number of the most lucrative positions in connection with the civil engineering works of the country at large.

In connection with the at times presented subject of providing a civil corps for the execution of river and harbor works, which is presented in part at least on the claimed ground that such work is of a civil nature, I would say the Corps of Engineers is not taking any part in the question of what character of work shall be assigned to it by Congress, but is endeavoring to carry out to the best of its ability and earnestly such work as Congress in its judgment may call upon it to perform. It appears, however, to be the desire and intent of Congress that the execution of river and harbor and similar engineering work shall remain under the supervision of the Corps of Engineers and therefore the Chief of Engineers feels it to be his duty, both in justice to the work and to his officers, to urgently ask that a sufficient number of officers be allowed the corps to properly do the work assigned to it.

And it may not in such connection be out of place to call attention to the fact that, as strongly presented by the Secretaries of War, it is necessary to have at the disposal of the Government for service in time of war a body of highly trained, experienced, and capable engineers, instructed both in their engineering and purely military duties, and it is important that this body of officers be trained during time of peace in duties allied to those they will be called upon to perform in time of war. It is only on the river and harbor and other engineering work of the General Government that such a body can be practically kept in training. Having such a body of men, it would seem wise that their services should be utilized in a manner which, while keeping them in training, will at the same time fully at all times reimburse the Government, through the value of services, the cost of maintenance, rather than confining such work in peace times to theoretical training and making them at such times a burden on the Treasury rather than a source of income.

The number of officers which would result from the proposed increase is imperatively needed for the proper execution of duties now devolving on the corps, and such number is understood to be still less than the number considered by the General Staff to be necessary at all times in connection with the construction of seacoast defenses, military surveys, the improvement of the water communications, command of engineer troops, etc.

In connection with the military side of the engineering work of the Corps of Engineers, I may quote from a recent military publication in a reference to the execution of public work by the corps: "What the digging of the Panama Canal needed was not only military engineering skill but military organization, military directness, military simplicity of purpose, military freedom from political contamination, and that fine

esprit de corps of a military branch which makes the success or failure of one member of it the personal concern of the whole body; therefore we feel justified in pointing to the canal situation to-day and the inevitable completion of that waterway as a triumph of military preparedness."

Very sincerely,

WM. L. MARSHALL,
Chief of Engineers, U. S. Army.

Hon. J. A. T. HULL,
*Chairman Committee on Military Affairs,
United States House of Representatives, Washington, D. C.*

The CHAIRMAN. Gentlemen, to-morrow we will hear General Bell and the civilian engineers.

(Thereupon, at 12.10 o'clock p. m., the committee adjourned until to-morrow at 10.30 a. m.)

COMMITTEE ON MILITARY AFFAIRS,
HOUSE OF REPRESENTATIVES,
Wednesday, March 9, 1910.

The committee met at 10.45 o'clock a. m., Hon. George W. Prince presiding, having under consideration H. R. 7117.

STATEMENT OF MR. CHARLES MACDONALD, OF NEW YORK CITY.

Mr. PRINCE. What is your profession, Mr. MacDonald?

Mr. MACDONALD. Civil engineer.

Mr. PRINCE. How long have you been engaged in that profession?

Mr. MACDONALD. Since 1857.

Mr. PRINCE. What preparatory course did you take before you entered up on your profession?

Mr. MACDONALD. I was graduated from the Renssela Institute, Troy, N. Y.

Mr. PRINCE. How many years were you a student at that institution?

Mr. MACDONALD. Three years.

Mr. PRINCE. That was the required time for completing the course?

Mr. MACDONALD. That was the regular curriculum; yes.

Mr. PRINCE. Will you state to the committee what works you have been engaged on as an engineer?

Mr. MACDONALD. I was engaged on the construction of a railroad in Michigan in 1858 and 1859.

Mr. PRINCE. What railroad?

Mr. MACDONALD. The extension of the Grand Trunk Railroad of Canada from Port Huron to Detroit. In 1863 I was employed on the Reading Railroad in connection with the construction of branch lines. In 1870 I established an office in the city of New York as a designer and constructor of bridges, and I remained in active practice until the year 1900, when I retired.

Mr. PRINCE. What bridges have you had under your supervision?

Mr. MACDONALD. The Merchants' Bridge at St. Louis, the Leavenworth bridge across the Missouri at Leavenworth, the Poughkeepsie bridge across the Hudson, and the Hawksbury bridge in Australia, besides a number of minor structures in different parts of this country.

Mr. PRINCE. You desire to be heard upon what branch of the question that is before the committee?

Mr. MACDONALD. I will speak, with your permission, of the reason of our being present as a committee. This proposed law was brought to our attention, and we held a meeting of engineers in New York some days ago.

Mr. PRINCE. Will you be kind enough to tell what proposed law, the number of the bill?

Mr. MACDONALD. H. R. 7117.

Mr. HAY. That is the bill to increase the Engineer Corps, is it?

Mr. MACDONALD. Yes, sir. A meeting was called and a committee appointed to consider what might be done toward improving the condition of civilian engineers employed in the corps.

Mr. PRINCE. Just before you go into that, you say a meeting was called; how many were present at that meeting?

Mr. MACDONALD. Thirty.

Mr. PRINCE. How large is your association of which these members were a part?

Mr. MACDONALD. About 4,500.

Mr. PRINCE. Do you feel fully authorized to speak for the 4,500 through your committee?

Mr. MACDONALD. I can only submit as our credential the action of the board of direction of our society, the American Society of Civil Engineers [reading]:

NEW YORK, March 3, 1910.

Mr. ALFRED NOBLE,

Past President American Society Civil Engineers.

7 East Forty-second Street, New York City.

DEAR SIR: I have the honor to inform you that at a meeting of the board of direction of the American Society of Civil Engineers, held at the house of the society, March 1, 1910, the following resolution was unanimously adopted:

"Resolved, That the board of direction heartily approve and indorse the action taken at a recent meeting of members of the society in appointing a committee consisting of Charles MacDonald, Alfred Noble, William H. Burr, F. P. Stearns, and Samuel Whinery, with the object of urging suitable recognition of civilian engineers employed on river and harbor works in the proposed legislation providing for an increase of the Engineer Corps of the Army.

Yours, respectfully,

CHAR. WARREN HUNT,
Secretary.

That is our credential. The gentlemen connected with that committee are all here with the exception of Mr. Whinery, and we could not get word to him in time to have him report with us.

Mr. PRINCE. Now, Mr. MacDonald, proceed in your own way.

Mr. MACDONALD. The opinion among civil engineers in this country I believe is unanimous that the work done by the Engineer Corps of the Army is deserving of the highest praise, and should receive the active support of the Government and of the people. But we are equally aware of the fact that much of the credit for results obtained has been due to the active cooperation of civilian engineers in the employ of the Engineer Corps as subordinates to officers of that corps, who can not hope for official recognition for services rendered under existing conditions. For that reason we have thought, after consultation, that it might be possible to frame a modification of this proposed bill so as to provide for such recognition. We wish simply to call your attention to section 4, and our proposed modification of that. This is as we would like to have you consider it:

Sec. 4. That whenever it shall be necessary or advisable, in order to properly prosecute works of river and harbor improvement, the Chief of Engineers is authorized to appoint or detail for duty in charge of river and harbor districts, or as members

of boards of engineers, any assistant engineers in the employ of the Engineer Bureau of the War Department: *Provided*, That assistant engineers so appointed or detailed shall, while so engaged, have the relative grade of captain or major in the Corps of Engineers, to be determined by the Chief of Engineers: *And provided further*, That neither assistant engineers nor officers of the Corps of Engineers shall be detailed in charge of river and harbor districts or divisions until they have had at least five years' experience on river and harbor work.

Of course, you will realize that the two important modifications there relate to relative rank and time required, as a matter of experience, for engineers to be placed in charge of districts or divisions. It would seem scarcely to require argument that a suitable time should have elapsed; that is to say, an engineer who is placed in charge of a district or a division should have had suitable experience in works of that kind in order to be intrusted with its execution.

As to the matter of rank, we have felt that if some such recognition of the services of civil engineers could be assured, the service would be made more attractive to men who, by their own unaided efforts, have acquired proficiency in their profession, and that if that were the case, there would be such a number, in addition to the working force of the corps, as would scarcely make it necessary for the transfer of officers from the army to the corps, as provided in the proposed bill. That is our position, gentlemen. We are not working for ourselves, but for the younger men who we know have done good service in the corps, and, if it is a possible thing, to see that those services are suitably recompensed and made more attractive than they have been in the past, for the reason that I believe there is no authority in law for the appointment of assistant engineers in charge of districts. Certainly men who are capable of doing work that the assistants have done in the past ought to be placed in independent positions, so as to receive such credit as may accrue from successful work.

MR. HAY. Mr. MacDonald, on this question of rank, you provide that the rank shall only be held during the time that the man is employed on this work?

MR. MACDONALD. Yes, sir.

MR. HAY. I do not understand exactly. Would you have him wear the uniform of an officer?

MR. MACDONALD. No. I suppose that "relative rank" would indicate his standing, his relative standing, with regard to officers who hold commissions.

MR. HAY. Would you have him command, for instance, or be placed over an army officer?

MR. MACDONALD. Unquestionably, if he had the experience that the army officer did not have.

MR. YOUNG. You mean if he had the higher rank?

MR. HAY. If he had the rank; say, for instance, the rank of major or captain.

MR. MACDONALD. Yes; the fact that he had a relative rank would permit of his being placed over an officer of lower rank.

MR. YOUNG. Is it your idea that this would carry with it the pay and emoluments of an officer of the army, commutation of quarters, the right to retired pay if injured in the service, retirement, and all that sort of thing?

MR. MACDONALD. I hardly think it would go as far as that. I believe that assistant engineers are employed now by the officers of the corps at a stipulated salary to perform this work. If they were

put in a position where they could in time get credit for the work that they do, the salaries that they would receive as agreed upon would be considered adequate, and it would be an inducement for a great many more civil engineers to come in and assume work in the corps.

Mr. YOUNG. That would carry with it, would it not, certainly while they were employed, the pay of the army officers?

Mr. MACDONALD. No; it would carry only the pay that they had agreed to be employed for. They are employed by the corps.

Mr. YOUNG. Is that pay, on the whole, satisfactory for the service rendered?

Mr. MACDONALD. I believe it is; I could not speak from personal knowledge.

Mr. YOUNG. Then, so far as this rank goes, it is simply a question of rank as an army officer, as the right to command?

Mr. MACDONALD. The right to take control of a particular division or district.

Mr. YOUNG. Yes; but that was given in the bill without your amendment, the right to be appointed in charge of a district; but you wish, in addition to that, the right to command and the rank?

Mr. MACDONALD. Yes, sir.

Mr. YOUNG. That is all, is it?

Mr. MACDONALD. That is all.

Mr. YOUNG. As to this further provision, that no one shall be placed in charge of a river and harbor district or division until he shall have had at least five years' experience in river and harbor work, do you not think that is a pretty inelastic provision?

Mr. MACDONALD. It has frequently been the case. I have been informed that officers of the corps who have not had experience are placed in charge of districts over assistant engineers who have had longer experience and who have been carrying on the work, and it was for the purpose of insuring a suitable recognition of time or experience that that was put in.

Mr. YOUNG. Do you not find in civil life—everywhere, in fact—that it frequently happens that a man of four years' experience is more efficient than another man of ten years' experience, because of greater natural capacity for that kind of work?

Mr. MACDONALD. Undoubtedly.

Mr. YOUNG. Do you know how long an experience in charge of river and harbor work Colonel Goethals had when he took charge of the Panama Canal?

Mr. MACDONALD. I will have to ask you to ask some of the other gentlemen, Mr. Noble, for instance, who is more familiar with the Panama Canal and that work than I am.

Mr. YOUNG. His record there to date has been eminently satisfactory, has it not?

Mr. MACDONALD. So I believe.

Mr. MORGAN. Did I understand you to give the number of engineers in civil life that are employed in government work?

Mr. YOUNG. Colonel Abbot gave that the other day, 202.

Mr. MORGAN. That is from civil life?

Mr. YOUNG. Yes, employed in the Engineer Corps.

Mr. PRINCE. If there are no further questions we will excuse you, Mr. MacDonald. Have you any further suggestions to make?

Mr. MACDONALD. As the Panama Canal question has come up, I would ask you if you would allow Professor Burr to state as to the organization of that work and how it is at the present time.

STATEMENT OF PROF. WILLIAM H. BURR, NEW YORK CITY.

Mr. PRINCE. What is your profession?

Mr. BURR. Civil engineer.

Mr. PRINCE. How long have you been engaged in that profession—how many years?

Mr. BURR. Since 1872.

Mr. PRINCE. What institution are you a graduate of?

Mr. BURR. The old civil engineering school at Troy, the Rensselaer Polytechnic Institute.

Mr. PRINCE. How many years were you a student before you graduated?

Mr. BURR. Four years.

Mr. PRINCE. You took the regular course?

Mr. BURR. The regular course.

Mr. PRINCE. Will you be kind enough to tell the committee what engineering projects you have been connected with?

Mr. BURR. I have been in continuous engineering practice, as well as my instruction work, since 1872. I have been engaged some ten or twelve years continuously, but not in unbroken continuity, in the construction of wrought-iron and steel bridges. I have also been engaged on waterworks construction, the first of which was in 1873. I have been engaged as consulting engineer in various capacities for the different departments of the government of the city of New York during the past eighteen years in the construction of bridges across the Harlem River and at City Island in the city of New York; as consulting engineer for the department of docks for a period of three years and the department of public parks in the construction of the Harlem River driveway, which work I had in charge for some three years; also as the consulting engineer for the aqueduct commission in the construction of the reservoirs and dams in the Croton watershed, for a period of four years, and I am now engaged in a similar capacity in the construction of the new waterworks for the city from the Catskill Mountains.

Mr. PRINCE. Will you be kind enough to tell how much money is involved in that construction work—what is the contemplated cost of it?

Mr. BURR. The Catskill water supply?

Mr. PRINCE. Yes.

Mr. BURR. About \$161,000,000. I was also a member of the board appointed by the then President Cleveland in the location of a deep-water harbor on the coast of southern California. I was also a member of the first Isthmian Canal Commission during its entire life. I was a member of the first personnel of the present Isthmian Canal Commission, and subsequently a member of the international board of consulting engineers for the present Isthmian Canal Commission. In addition to that, I have held for nine years the professorship of rational and technical mechanics at the institution from which I graduated; in 1891-92 I held the professorship of engineering at Harvard University, and during the past seventeen years the professor-

ship of civil engineering at Columbia University. Those are the principal features.

Mr. PRINCE. I think you have persuaded me you are a pretty good expert and have some knowledge as to what you are going to talk about. You are a member of the committee that was to appear before the Military Affairs Committee on the bill we have under consideration?

Mr. BURR. I am.

Mr. PRINCE. How many members are there of your association of civil engineers in the United States?

Mr. BURR. Mr. MacDonald has already given that information—about forty-five hundred.

Mr. PRINCE. Will you be kind enough now to go on in your own way, Professor Burr—I think that is what they call you, Professor?

Mr. BURR. I usually dodge the title when I can. (Laughter.)

Mr. PRINCE. "Mr." Burr, if you prefer that—and give us your views on the question under consideration.

Mr. BURR. Mr. Chairman, the question has been so well stated, to my mind, by Mr. MacDonald, who preceded me, that I will not take up the time of the committee in going over those points which he has so well covered.

I wish to say that I concur fully in the statements which he has made, and I desire to add even to what he has stated in reference to the high character and excellence of the work which has been done, and is being done, by the Engineer Corps of the Army, and to state emphatically that our position in this matter is not one which should be taken as in anyway critical of that work. We simply desire to improve, so far as that may be possible, the position of the civil engineers now in the employ of the Corps of Engineers, and we feel that their work has, in general, been of a highly creditable character; that they have cooperated cordially and effectively, from a professional point of view, with their superiors in the service of the Corps of Engineers, and we feel that it is only right to them, that is, to the civil engineers in the employ of the corps, to recognize their services a little more definitely than has heretofore been done, although, as the words of the proposed amendment show, wholly under the control of the Chief of Engineers, under his approval and direction. We believe that some such amendment as that which has been proposed will not only serve the ends of justice, so far as the recognition of the service of the civil engineers is concerned, but will also conduce to the effectiveness of the service. It goes without saying that it is a part of human nature—and I think it is a creditable part of human nature—to say that the services of any man, if they are more equitably and justly recognized, will naturally add to the efficiency of those services. The recognition which is called for is limited. It certainly can not be regarded as unreasonable or extravagant in its scope. It changes very little the present condition in essence or material, but it does give that added recognition which every man who is performing his work creditably is, I think, entitled to receive; especially, as I have already stated, when what is asked for is still under the approval and direction of the Chief of Engineers.

Mr. YOUNG. Mr. Burr, this proposition as to rank is a new one to me, and I do not know that I grasp it entirely, and so I would like to ask you a few questions about it. Mr. MacDonald says it was the

idea of those who framed this provision that the rank should carry with it the right to command officers of inferior grade. Will it also carry with it the duty of military obedience and submission; for instance, to such a thing as a court-martial, if charges were preferred?

Mr. BURR. I see no reason why any officer engaged in that service should not meet every responsibility attached to his position. Of course he carries, under the terms of this amendment, the relative rank and grade while he is engaged in this work, and only so far as they pertain to this work.

Mr. YOUNG. Would he be at liberty, for instance, if not satisfied with the position, to leave it at any time without any other liability than that for a violation of his contract?

Mr. BURR. That is a detail of administration which I think none of us would attempt to formulate here, but I have no hesitation in saying that that is a matter which should be determined under the administration of the corps, and if it is considered that he should not leave it—that is, that the efficiency of the work required he should remain upon it until its completion—in other words, meet the full responsibility of his position—then he should certainly do as any other officer would under those circumstances. He should have no concessions whatever, any more than any other officer. In other words, he puts himself in precisely the position of any other officer of that relative rank and grade, and he must meet the responsibilities, whatever they are.

Mr. YOUNG. Would it be your idea that that would involve the right of his superiors to send him from one piece of work to another?

Mr. BURR. Certainly.

Mr. YOUNG. Send him from one end of the country to the other?

Mr. BURR. He should meet the responsibilities as well as enjoy the relative rank of his position.

Mr. YOUNG. Do you think that the civil engineers at present in the service would be willing to submit to any such responsibilities as that without a considerable increase in pay? For instance, a civil engineer in the employ of the Corps of Engineers is usually stationed at some place. He frequently owns a house there, owns property there, and it would be onerous for him to go somewhere else. Yet in the case of an army engineer that is continually done and thought to be necessary for the good of the service.

Mr. BURR. Yes. I see no reason why a civilian official, enjoying that relative rank and grade, should not carry exactly the same responsibilities, be subject to the same directions and orders from his superior officers.

Mr. YOUNG. Do you not think it would be necessary to increase the salaries in order that these engineers should submit to such further regulations and burdens?

Mr. BURR. If they carry those burdens and duties I really can not see why they should not have the same compensation while they discharge them. It does not carry with it the life tenure, but while they are discharging these responsibilities I do not see why they should not have the same compensation and carry with them the same responsibilities.

Mr. YOUNG. It was stated by Mr. MacDonald that it was not the intention of this provision that they should receive the pay of the officers in the army of the rank which they held, but only such pay as was agreed on in each case; it was to be a matter of bargain.

Mr. BURR. It may be so; that is a question which has not been clear in my mind, and what might be the most wise and advisable, although I am free to say, individually, as a member of this committee, that if a civilian engineer is performing the same duty, carrying the same responsibility, subject to the same burdens, so to speak, that a regular officer of the corps is carrying, it strikes me it is only a matter of justice that he should have the same compensation.

Mr. SULZER. In the same rank and title?

Mr. BURR. The same relative rank and grade, and it seems to me that it would only be reasonable. I do not insist upon that, but it strikes me as only reasonable that he should have the same compensation.

Mr. SULZER. Then do I understand you to contend that a civilian engineer employed in this line of work should have the same rank and grade as an engineer in the Regular Army?

Mr. BURR. The same relative rank and grade with the limit as given in the amendment. That is not a wide-open field.

Mr. SULZER. And the same compensation?

Mr. BURR. We have not any of us stated that matter definitely, because it is, to a certain extent, subordinate; but it seems to me that if a civilian engineer is doing the same work, carrying the same burden, that he should have the same compensation. But that is not a matter which I should insist upon.

Mr. PRINCE. I think, Mr. Burr, in your substitute, you say he should have the relative grade of captain or major in the Corps of Engineers; it is limited to that extent.

Mr. BURR. Yes; that is what I meant when I said it was limited in the amendment.

Mr. PRINCE. I do not think Mr. Sulzer saw this amendment.

Mr. YOUNG. Just one thing more. As to this provision as to five years' experience on river and harbor work, is there not other engineering work engaging in which an officer or civilian might fit himself for river and harbor work so he would be about as well qualified as a man who had had the experience in that particular line of work?

Mr. BURR. I believe there is, sir; and I have not taken the view, quite, which I understood you to express when Mr. MacDonald was speaking, that it is so inelastic. I should interpret any regulation of that kind reasonably and liberally, because it is one of those things that it is almost impossible to put literally. An engineer might have been doing the same class of work which he would have to do under river and harbor service, and not nominally in river and harbor service. Whatever experience he has had which is equivalent to that, it seems to me, under such a regulation, should be liberally interpreted.

Mr. YOUNG. That would require a change in this provision, in the way it is worded, "that neither assistant engineers nor officers of the Corps of Engineers shall be detailed in charge of river and harbor districts or divisions until they have had at least five years' experience on river and harbor work."

Mr. BURR. I admit that the wording is rather unelastic, but I do not believe—while I would not pretend to speak finally for my colleagues on the committee—I do not think it was the intention of the committee that the literal wording of such a regulation should be applied too drastically.

Mr. YOUNG. If it went into a statute it would have to be applied literally, of course, because it is clear. Should not this be modified?

Mr. BURR. In the wisdom of the committee that might easily be done, but I think even a statute is sometimes liberally interpreted to cover questions of that sort. What is meant, the essence of that, is that an engineer carrying those responsibilities should have had experience equivalent to that, which might be reasonably interpreted to mean that.

Mr. HAY. Why not leave it out entirely, and leave it to the discretion of the Chief of Engineers to say whether they have had sufficient experience?

Mr. BURR. It was thought by the committee making these recommendations that it might be better to relieve the commanding officer, perhaps, of quite that much discretion, and insert this as a guide. While no one, I am sure, has more confidence in the discretion of the Chief of Engineers of the United States Army than I, it strikes me it would be better to aid him in that, that is, to relieve him somewhat of that unqualified responsibility, and indicate within a reasonable limit about what an engineer's experience should be. His discretion in interpretation would have to be relied upon a good deal whatever that regulation might be.

Mr. SULZER. Mr. Burr, just for the purpose of getting information, may I ask you if it is the contention of those advocating this bill that the number of graduates in the Engineer Corps from West Point is insufficient to do the work of the Government?

Mr. BURR. If I understand your question, that is carrying me a little beyond my particular jurisdiction. The advocates of the bill as a whole, of course, can answer that question. I should be a little reluctant to undertake to answer it broadly. As I have said before, from my experience with the Corps of Engineers I should say, if in the opinion of the Chief of Engineers and his advisers the present number is insufficient for the work before it, that number is insufficient, because I am somewhat familiar, and have been for a number of years, with the general work and character of the corps, and I have no doubt in my own mind that, if the Chief of Engineers believes that the number should be increased, it should be increased.

Mr. PRINCE. I want to ask you something about the Isthmian Canal. As I understood Colonel Abbot, there are 10 of the regular corps at work on the Isthmian Canal. There are 15 of the young graduates who are there being trained that ought not to be regarded as a part of the corps. Do you recall how many civil engineers there are there in the employ of the Government?

Mr. BURR. I regret that Mr. MacDonald should have put upon me the responsibility of answering the question, because I do not know what it is. I have had no connection with the work for the last four or five years, since the international board was dissolved, and while I keep in touch with it through the official reports constantly, I can not answer that question.

Mr. PRINCE. Can you answer that question, Colonel Abbot?

Colonel ABBOT. No, sir; it is not under the Chief of Engineers. We would not have any means of knowing except through the newspapers.

Mr. PRINCE. Can you give us some idea as to the relative number Mr. Burr?

Mr. BURR. Of civil engineers?

Mr. PRINCE. Civil engineers who are under the employ of the Government, under the direction of these 10 Regular Army engineers?

Mr. BURR. I can not, Mr. Chairman, but I should say that the number of civil engineers in the entire organization is many times that of the engineer officers of the army.

Mr. PRINCE. As a former member of the Canal Commission, did you have occasion to see the class of work that these civil engineers were doing?

Mr. BURR. I did.

Mr. PRINCE. Were they in charge of responsible persons?

Mr. BURR. At that time the entire organization was made up of civil engineers. I do not recall that there was a single member of the Engineer Corps in the organization. There might have been one or two younger members, but I do not recall now that there was one.

Mr. PRINCE. That was at the beginning of the work?

Mr. BURR. That was at the beginning of the work, the first year of the life of the present commission, during the organization. The entire work of the construction of the canal was organized at that time, including the quarantine, sanitary, and hospital organizations; the whole thing.

Mr. PRINCE. Was that the basic plan that has been since carried out?

Mr. BURR. Especially so, subject to the natural developments of such a work.

Mr. PRINCE. That was wholly laid out and originated by civilian engineers?

Mr. BURR. It was.

Mr. PRINCE. I have no further questions.

STATEMENT OF MR. ALFRED NOBLE, OF NEW YORK CITY.

Mr. NOBLE. I haven't anything to add to the presentation that was made.

Mr. YOUNG. You agree with the positions of these other gentlemen?

Mr. NOBLE. In general, yes.

The CHAIRMAN. Does anybody wish to ask Mr. Noble any questions? If not, there is no use detaining him further. Does that end your hearing, gentlemen, as far as you desire to go?

Mr. MACDONALD. Yes, sir.

Mr. PRINCE. I think under the rules the hearings will be submitted to each of the gentlemen, and if they wish to correct them in any way, or add any data, I do not think the committee would have the slightest objection. We will leave it entirely to you to amplify anything you see fit, or to modify in any way. What we want are the facts, from your point of view.

Mr. MACDONALD. And if we can answer any questions that occur to you, we will be only too glad. We thank you, Mr. Chairman and gentlemen.

(Thereupon, at 11.30 o'clock a. m., the committee proceeded to other business, after which an adjournment was taken until to-morrow, Thursday, March 10, 1910, at 10.30 o'clock a. m.)

AMERICAN SOCIETY OF CIVIL ENGINEERS,
New York, March 3, 1910.

Mr. ALFRED NOBLE,
Past President American Society of Civil Engineers,
7 East Forty-second street, New York City.

DEAR SIR: I have the honor to inform you that at a meeting of the Board of Direction of the American Society of Civil Engineers, held at the house of the society March 1, 1910, the following resolution was unanimously adopted:

"Resolved, That the Board of Direction heartily approve and indorse the action taken at a recent meeting of members of the society in appointing a committee consisting of Charles MacDonald, Alfred Noble, William H. Burr, F. P. Stearns, and Samuel Whinery, with the object of urging suitable recognition of civilian engineers employed on river and harbor works in the proposed legislation providing for an increase of the Engineer Corps of the Army."

Yours, respectfully,

CHAS. WARREN HUNT, *Secretary.*

[To be submitted for section 4 of H. R. 27372.]

SEC. 4. That whenever it shall be necessary or advisable, in order to properly prosecute works of river and harbor improvement, the Chief of Engineers is authorized to appoint or detail for duty in charge of river and harbor districts, or as members of boards of engineers, any assistant engineers in the employ of the Engineer Bureau of the War Department. *Provided*, That assistant engineers so appointed or detailed shall, while so engaged, have the relative grade of captain or major in the Corps of Engineers, to be determined by the Chief of Engineers: *And provided further*, That neither assistant engineers nor officers of the Corps of Engineers shall be detailed in charge of river and harbor districts or divisions until they have had at least five years' experience on river and harbor work.

COMMITTEE ON MILITARY AFFAIRS,
HOUSE OF REPRESENTATIVES,
Washington, D. C., Thursday, March 10, 1910.

The committee met this day at 10.55 o'clock a. m., Hon. John A. T. Hull (chairman), presiding.

The CHAIRMAN. Gentlemen, there is hardly a quorum here now, but still we can go ahead with the hearing. General Bell is here this morning.

General, you can take up the bill H. R. 7117 and give the committee any information on it that you may desire.

STATEMENT OF MAJ. GEN. J. FRANKLIN BELL, U. S. ARMY, CHIEF OF STAFF, ACCOMPANIED BY GEN. ALEXANDER MACKENZIE, U. S. ARMY (RETIRED), FORMERLY CHIEF OF ENGINEERS; COL. FREDERIC V. ABBOT, AND MAJ. WILLIAM B. LADUE, U. S. ARMY, ASSISTANTS TO THE CHIEF OF ENGINEERS, AND CAPT. JOHNSON HAGOOD, U. S. ARMY, OF THE GENERAL STAFF.

General BELL. Mr. Chairman, this bill originated during the last Congress and was forwarded to the Congress by a previous Secretary of War, General Wright, with modifications. It was reintroduced during this session of Congress, but was not received at the War Department for report until a few days ago. There was not time to have the bill thoroughly considered by the General Staff, as is the usual custom under the regulations, but it was considered by the Assistant Secretary of War at the request of the Secretary, and the Secretary of War thereupon returned the bill, inclosing a letter expressing his views.

During the consideration of the bill by the committee I have been in consultation with the officers representing or now in charge of the office of the Chief of Engineers, all of whom are now present—Colonel Abbot, and Major Ladue, and General Mackenzie, who has intervened in the matter upon the request of the Chief of Engineers, who is absent, and because of his familiarity with the circumstances and the proposed legislation.

Owing to developments during the previous hearing these officers and I have formed the conclusion that certain modifications in the bill are desirable. This morning I presented our views to the Secretary of War, who concurred therein and authorized me, as Chief of Staff, to make certain modifications in the letter which he sent as his report on the bill.

I will now take up the bill and will comment upon its features and will state the modifications which we have all concurred in recommending, which modifications are approved by the Secretary of War.

The first section we are all agreeable to, and this meets the approval of the Secretary of War.

In the second section we have concurred in recommending that the word "practicable," in the fourth line, be stricken out, and that the words "may be consistent with the interests of the military service" be substituted therefor.

Mr. YOUNG. "May be consistent with the interests of the military service?"

General BELL. Yes; that the words "may be consistent with the interests of the military service" be substituted therefor; that is, substituted for the word "practicable."

I may add that this substitution is made because the word "practicable" is more or less indefinite in meaning and might lead to very serious difference of opinion as to its scope in practical administration.

In the sixth line we have agreed that the words "selected as heretofore" be stricken out because indefinite and unnecessary.

The CHAIRMAN. Why is that indefinite?

Mr. YOUNG. Does not that change the present law?

General BELL. No, sir.

The CHAIRMAN. Why is it indefinite?

General BELL. Because there is no rule governing selection. There has been no rule governing selection heretofore.

The CHAIRMAN. Has not the rule been to select as many as there were vacancies for, running from one to nine?

General BELL. No, sir; it is rather that all of the vacancies have been filled. There has been no uniform rule whatever. There is a custom, which custom no one proposes to interfere with, allowing the cadets to choose their branch of the service in the order of class rank. I may add there is no danger of interfering with this rule, because in a hundred years no one has discovered or proposed any method as a substitute for that method.

Mr. SLAYDEN. That is a sort of reward for diligence in study anyway, is it not?

General BELL. Yes, sir. It is a rule that is absolutely essential in order that the competition which exists at West Point may be carried out and maintained. There is a competition for class standing, the incentive in the competition being the privilege of choosing

the branch of the service and the rank which winning in the competition bestows upon a cadet after he is appointed in the army.

Mr. YOUNG. But, General, this right to choose must be subject to some limitation, of course. They might all choose the Engineers, for instance. What is that limitation?

General BELL. The limitation was indicated in my remark that they choose according to the class rank. After the vacancies have been chosen, of course no cadet can choose the same vacancy, and this privilege of choosing according to class rank results in the No. 1 man having the choice of everything. No. 2 has the choice of everything that is left, and so on down the list; and that is the only limitation, with this exception, that the academic board has always been accustomed to recommend a certain number of men as qualified for the Engineers, and no man not recommended for the Engineers has the privilege of choosing the Engineers. He might choose it, but he would not get it.

Mr. PRINCE. Right there, General: That is limited to those who stand highest?

General BELL. They never skip. They recommend so many men from the highest down the list, but in different years they recommend different numbers.

The CHAIRMAN. According to the demands of the service?

General BELL. Depending on the number of vacancies in the Engineers.

Mr. PRINCE. Let me ask this, to get it clear in my own mind: Suppose there are 10 officers standing in order from 1 to 10. There is one standing 15, who has aptitude for the Engineer Corps, but he does not stand high enough in his studies to warrant his being regarded as one of the 10. Would they take him under any circumstances and skip over those between 10 and 15?

General BELL. The best way for me to answer that is to say they never have done so.

Mr. PRINCE. That answers it.

General BELL. And it would not be approved, if they did, because that would destroy the element of competition which it is the endeavor and purpose of the War Department to encourage. A competition based upon class rank would cease to be a competition if some man were given the privilege above those who were graduated above him. Consequently, inasmuch as it has never been done, it does not seem to me that there is any probability of anyone trying to do it in the future. That is correct, is it not?

General MACKENZIE. Yes. It never has been done.

Mr. PRINCE. I thought it never had been done, but I thought I would put that concrete case so that it could be answered and clear up the question.

Mr. HAY. At the Military Academy there is no such thing, then, as selection?

General BELL. No, sir; except such selection as the individual makes in exercising his choice.

Mr. HAY. I mean by the superior officer in making the assignment? He does not select anybody? These cadets get their positions in different corps by virtue of the standing which they have in the class?

General BELL. That is correct, Mr. Hay. Of course, there is a limited selection implied in the limited number of cadets recommended by the academic board as qualified for the Engineers. That is the only selection.

Mr. YOUNG. As a matter of fact, General, all the officers in the Engineer Corps have come from West Point, have they not?

General BELL. There have been some members of the Engineer Corps in the past who were not graduates of the Military Academy, forty or fifty years ago.

Mr. YOUNG. Not within forty or fifty years?

General BELL. I could not state the exact years, but for a long time there has been no one in the Engineer Corps not a graduate of the Military Academy.

Mr. PRINCE. There is no one now in the corps who has not been graduated from the Military Academy?

General BELL. There is not.

Mr. YOUNG. You would not recommend any change in that respect unless it was a matter of absolute necessity, would you?

General BELL. Mr. Young, I think I had better answer that question a little later, in connection with another recommendation of the Secretary of War, contained in his letter.

Mr. YOUNG. Very well.

General BELL. To finish this testimony concerning the striking out of the three words "selected as heretofore," I will add to that, that no one would understand definitely just what was referred to, because the selection heretofore has been a matter of custom and has varied so much from year to year, as I have explained, that those words were considered both indefinite and unnecessary; unnecessary because no one proposes to change the method of selection, as it is impracticable to change it.

With reference to the remainder of the second section, it was at first considered essential to strike out the words "recommended by the Chief of Engineers and," contained in the tenth and eleventh lines; but owing to developments during the hearing before the committee the officers from the Office of the Chief of Engineers and myself concluded it would be advisable to strike out all that portion of the section relating to transfers from the army at large, and this has been approved by the Secretary of War. It was also covered in his letter.

Mr. YOUNG. How, then, if you did not get a sufficient number of officers from West Point, would those vacancies be filled if this is stricken out?

The CHAIRMAN. Would you leave those from civil life in?

General BELL. Let me state, Mr. Young, first, just what words were to be stricken out from the second section. Beginning with the word "by," in the eighth line, strike out "by transfer of officers."

Mr. YOUNG. That is in the seventh line.

General BELL. No; the eighth line; beginning with the word "by," in the eighth line.

Captain HAGOOD. There is a "by" in the seventh line and also in the eighth line.

Mr. YOUNG. I got hold of the wrong bill.

General BELL. Beginning with the word "by," in the eighth line, strike out "by transfer of officers from the army at large, under

such regulations as to the examination and selection as may be recommended by the Chief of Engineers and approved by the Secretary of War or," ending with the word "or" —

The CHAIRMAN. You provide that vacancies that shall not be filled in any calendar year shall be "as hereinafter provided?"

General BELL. That is correct.

Mr. HAY. That would cut out the transfers absolutely?

General BELL. Yes.

Mr. HAY. General, if it does not interrupt you, how many vacancies are there in the Engineer Corps at the present time?

General BELL. Ten.

The CHAIRMAN. This does not take into account the graduating class?

General BELL. We propose to hold them until June.

The CHAIRMAN. Do you not always hold the vacancies for the graduating class?

General BELL. Yes; always. It is the law.

The CHAIRMAN. So that there is little probability of vacancies being filled either by transfer from the army at large or from civil life?

General BELL. I would not say that, Mr. Chairman, because that would be prognosticating rather recklessly as to what will occur in the future, for it can not be foreseen. But I will proceed now to explain why we cut that out.

Mr. HAY. Well, General, I do not want to interrupt the thread of your thought, but I would like to ask you if we could not get better officers for the Engineer Corps from the army at large than we can from civil life?

General BELL. Mr. Hay, that depends upon so many considerations and conditions that it could hardly be answered yes or no without the probability of creating erroneous impressions. I will say that, taking the benefit, the undoubted benefit, of military training into consideration in connection with the duties, all the duties, that the Engineer Corps is required to perform, we could undoubtedly get better officers for those duties from the army on an average than we could get from any other source. But, taking into consideration exclusively the work performed in connection with rivers and harbors, it would be rather a rash conclusion to say that we could undoubtedly get better officers from the army, because there are many eminent educational institutions in the United States that give a most excellent training for purely civil engineer work, and I have no doubt that from these institutions could be drawn officers for duty in the Engineer Corps who would be eminently qualified to do the work of civil engineering conducted by the corps. I must qualify that statement, however, by saying that I believe it is unquestioned by everybody that the training received at the Military Academy at West Point is very beneficial in character building, very beneficial in creating a sense of responsibility, a habit of subordination, a realization of the importance of complying strictly with both the letter and the spirit of instructions and of the law, which is very valuable in connection with the work which the Engineer Corps has to perform.

Mr. HAY. General, after you get a man in the Engineer Corps from civil life you can not always say that he is going to be employed on river and harbor work, can you? He has got to be generally fitted

for his duties as an engineer officer. You could not detail him all the time for river and harbor work?

General BELL. Mr. Hay, it is not intended, so far as I understand the purposes of the Engineer Corps and the War Department, to confine any class of the officers of the Engineer Corps exclusively to any class of work. It would be unwise to do so.

Mr. HAY. I agree with you.

General BELL. And exceedingly unwise for Congress to make such a law. But, as you doubtless know, we have post-graduate schools known as the "service schools," and for the engineers there are two, one at Fort Leavenworth, Kans., to train engineer officers in their military duties exclusively, and one at Washington Barracks, to train them in their duties as civil engineers. These officers who come in from civil life would naturally be taught the elements of military knowledge and would be trained in these schools, and would unquestionably become just as well qualified for performing not only their military but their civil duties as other officers of the army who are appointed from civil life become. The fact that the Military Academy makes an especial and positive effort to inculcate an especial respect for the truth in all of its students, I should say, would produce on an average a better result in that line than would be produced by an institution which did not make an especial effort along that line. We find from experience in the army that satisfactory military administration can not be conducted unless officers have a scrupulous regard for the truth, and when I say "a scrupulous regard for the truth," I am not meaning to reflect in the slightest degree upon the graduates of other institutions, or to indicate that they also have not a scrupulous regard for the truth. But at West Point men are trained especially that when they make a statement over their signatures they are expected to have exhausted every ordinary source of research and investigation before making that statement, in order that they may be certain that the statement is exactly true. In other words, they are held responsible that it is the truth, and ignorance or being unaware that it was inaccurate is not accepted as an explanation or excuse. They are required to be cautious and careful and to know positively that it is the truth, and nothing but the truth.

Now, a training of this character in early youth is calculated to produce results in character building which are considered valuable, and in this particular regard we believe that those officers who have been so trained when they are young have an element of value a little bit in excess of those who have not been so trained while young.

Now, shall I resume the testimony where it was left off?

Mr. PRINCE. Just a moment before you go on. In looking over the army list and directory of the officers of the army I find this: That in June, 1907, 7 young men were put in the Engineer Corps, 7 graduates; of the graduates of 1908, 8 entered the Engineer Corps; of the graduates of 1909, 15 entered the corps.

Now, under this provision, the first part of section 2, could you not fill all of the vacancies from the graduates of West Point? You have been increasing, as I have read, from 7 to 8, to 15, the last. Suppose there were 25 vacancies in the corps, putting it in concrete form, could you not under the first part of section 2 fill all of those 25 vacancies from the 25 young men who stood highest in their class at graduation in June, 1910?

General BELL. Yes, sir.

Mr. PRINCE. Could you not fill it all from young men from the class if there were 50 vacancies?

General BELL. Yes.

Mr. PRINCE. Now, then, as a matter of fact, don't you believe you would do it?

General BELL. I certainly do not.

Mr. PRINCE. How many do you think you would take from that top of the list, assuming now that there were 25 vacancies? How many would you take?

General BELL. Mr. Prince, I am very glad you have asked me that question, because you doubtless recall that day before yesterday you made a statement which caused me to ask if I might interrupt, to say that there was another side to that question. I will now state the other side, Mr. Prince, at this point of the testimony.

The United States Military Academy, when first established in 1802, had for its purpose the training of engineers for the army. Since that time up to the present date the officers for the Corps of Engineers have been provided exclusively from graduates of the Military Academy. The Corps of Engineers has created for itself a most enviable record both as to its integrity and as to the high standard of efficiency among its personnel. Graduates of the Military Academy, especially those who graduate at the top of their classes, are well prepared, so far as education alone can prepare them, for the duties required of the Corps of Engineers and the Corps of Engineers could not, as a rule, all qualities considered, get better men elsewhere than it can from that source. If West Point graduated a sufficient number of cadets to furnish all the officers needed for the army, I do not think that the question would be raised as to whether or not the Corps of Engineers should get all of its officers from that source, but in view of the fact that only 43 per cent of the officers of the army are furnished from West Point, and that for the last ten years West Point has provided less than one-third of the total number of officers commissioned in the army, it manifestly becomes a question of great importance to the army whether the Corps of Engineers should continue to have its officers provided exclusively from West Point while other branches of the service get only a small proportion of their officers from that source.

When the Military Academy was first established as a school for engineers, it was intended to be a school for military engineers and not one for training officers to perform purely civil duties, such as those imposed at the present time upon about half of the officers of the Engineer Corps. The plan of training only engineer officers at West Point was very soon abandoned. In fact, the Military Academy was not established upon any firm basis until it was established as a military school, the purpose being to train young men for service as officers in the army, all branches of the army, both line and staff. This academy, being a military institution recognized the world over as second to none, and its graduates not being sufficient in number to supply all arms of the service, it would certainly seem that these graduates should be supplied to those arms where a military education will be of the greatest value and where such a training will bring the greatest returns to the Government which has furnished it.

Only a small part of the energy expended by the Corps of Engineers is expended on military engineering. The great mass of its work is of a civil nature and pertains to the profession of civil engineering. The course at the Military Academy in civil engineering is not very extensive. It is given to all of the cadets alike, and outside of his natural intellect and aptitude, the cadet who graduates at the top of his class is no better fitted for duty as a civil engineer than the great majority if his classmates. In other words, outside of their natural ability, the officers in the Corps of Engineers when they first enter that service are no better fitted for the duties of civil engineer than is the average army officer who enters the service through the Military Academy. They acquire real fitness by practical experience, just as every graduate of a school of engineering does in civil life.

On the other hand, there are a number of educational institutions in the United States which give a very thorough and complete technical education in civil engineering. There are institutions in which engineering courses are provided beside which the one at West Point must be considered more or less elementary. Graduates of these institutions would undoubtedly be quite willing to accept commissions as second lieutenants in the Corps of Engineers, and would at the outset undoubtedly be better qualified as civil engineers than the average graduate of West Point who now enters the Engineer Corps. But there is no other institution in the United States which gives a military training in any way comparable with that given at West Point. There is no other institution where a man could receive a course of instruction and start out as a second lieutenant in the line of the army having a better knowledge of the duties he is about to perform than that which would be had by a cadet just graduated from West Point.

The engineering problems solved by the Engineer Corps have been solved in a most capable manner, and the value of that corps to the Government because of the civil work performed would be hard, indeed, to estimate. Possibly the claim may be true that by the employment of the Corps of Engineers on river and harbor work and on other civil engineering work of similar character the Government saves millions of dollars over what it would cost to have it done in a way other than by the Engineer Corps.

But the engineer problems presented to and solved by the Corps of Engineers are similar in all respects to those which are presented to and solved by engineers in civil life every day, and there are thousands, yea, hundreds of thousands, of men in civil life all over the world performing civil engineer duties of a character similar in all respects to those performed by the Corps of Engineers. Indeed, it must be admitted that some of the problems solved by civilian engineers are more intricate than those which have been presented thus far to the Corps of Engineers.

In the entire history of the world there have been less than a baker's dozen of Alexanders, Hannibals, Cæsars, Cromwells, Fredericks, Washingtons, Napoleons, Grants, Lees, and Von Moltkes—masters of mobile operations in war. The military art, the art of war, is one which is incapable of solution. The military profession, thoroughly understood by a few, has been mastered by none. The mobile army of the United States should be given its equitable share of the best talent which West Point can produce. Because a man is

sufficiently brilliant to stand at the head or near the head of his class is not a good reason for depriving the mobile army of his services by assigning him to civil duty. The contrary is the case. The profession of civil engineer has never been considered one which necessarily requires a master mind. The Corps of Engineers has in its employ hundreds of professional civil engineers who have direct charge of the work performed by that corps. There is believed to be no particular difficulty in obtaining such assistants who, having been educated in civil life, are thoroughly qualified to handle the mathematical and technical details connected with the civil-engineering work performed by the Corps of Engineers.

I wish very much that the corps of cadets at the Military Academy was large enough to supply all of the officers for the army (except, of course, for the Medical Corps), in which case the practice would be continued of supplying all the officers in the Corps of Engineers from that institution. But so long as the corps of cadets is of its present size, and all branches of the line of the army must go out into civil life to recruit its officers, I believe that the Corps of Engineers should only get its proportionate share of cadets and should, with the rest of the army, make up the remainder by appointments from civil life. It will have an ample field of competent material among the graduates of technical engineering schools of the country.

I have spoken so far only of the line and the Engineer Corps, but it should not be forgotten that the other staff corps of the army have an equal interest in this matter. For example, the Ordnance Department is a corps whose work is intricate and technical, like that of the Engineer Corps. The problems in mechanical engineering presented to the Ordnance Department are as difficult as the problems in civil engineering presented to the Engineer Corps. The Ordnance Department gets its officers wholly by details from the line, and that corps has for many years been composed largely of men who graduated near the top of their classes at West Point.

I do not think that it could in equity be claimed that because of its technical and mathematical civil work the engineers should take the graduates to which the Ordnance Department would be entitled because of its technical and mathematical military work; yet if the Corps of Engineers is increased and the number of graduates assigned to it annually is increased, this will be the case unless, as has been pointed out above, the corps of cadets at the Military Academy is increased to provide a greater number of graduates for all branches of the line and staff of the army.

I have just referred, in speaking of graduates of the Military Academy, to the best talent of that institution. I wish to say that for military purposes it is by no means necessarily true that the man who graduates at the head of his class is best qualified. I believe on the average it is true that the man who graduates near the head of his class, or at the head of his class, is best qualified for the Engineer Corps. There are exceptions, because, of course, some men who are bookworms are not as practical in their ability as other men who have less capacity as students; but on the average the men who graduate at or near the top of the class at West Point are best qualified for the duties of the Engineer Corps.

Now, further on in this bill we have a provision, in the wisdom of which all of us have concurred, which has for its purpose revoking

the law which now requires that the Engineer Corps shall be exclusively filled from the Military Academy and permitting the filling of the Engineer Corps not only from the Military Academy but from civil life. That has been agreed upon because all of us acknowledge that in order to elevate the standard of the line of the army we must train the officers thereof to a higher degree than has been customary heretofore. Probably one of the best training schools for the art of war that ever existed on earth was the civil war which occurred in the United States in the sixties. The men who came out from a three or four years' experience in that war were better trained for their duties in war than we have ever had men to be since, but they had accomplished such a herculean task that they considered that they were entitled to rest, and they sat down and practically rested for twenty or thirty years. They did not do anything to train the young officers in their war duties. They wrote no books describing the knowledge and experience gained in that war, and, as a consequence, up to, we will say, about 1885, or well up to 1889, practically no efforts were made in our army to train army officers in their war duties, and we knew nothing about them. But about 1889 some of the progressive officers in the army began this system which has now been developed into a very thorough system of military education.

As this system has developed we have been discovering all the time that we have great need of competent instructors. It will be impracticable to put all of our officers through the service schools at Fort Leavenworth, but we hope to put through a sufficient number to qualify them as instructors of the rest of the army and of the national guard. It is a matter of extreme importance that we shall have a certain number of officers in our army highly qualified as instructors in the art of war, including strategy and tactics.

Now, the importance of this no one disputes. Therefore we now have an absolute necessity of more graduates from the Military Academy in the line of the army than we had in the old days, when we did not undertake to teach these higher duties to the army officers. No one disputes that. We are all agreed upon that proposition. So long as we did not touch war duties most any man was considered fit for the mobile army, and when I say "mobile army" I refer to all troops which go out and move around with the army which fights in the field in the war—field artillery, a portion of the Engineers, a portion of the Signal Corps, and a portion of all the Staff Corps.

Recently realizing that the infantry had never had its share of graduates from the Military Academy and that that was considered a handicap, the Secretary of War adopted a rule when I became Chief of Staff, upon my recommendation, apportioning graduates from the Military Academy to the different branches of the service in proportion to their strength in officers. The condition in the infantry got to be so bad at one time that there was only one graduate among its 450 first lieutenants.

Now, owing to the very thorough training given at the Military Academy it is unquestionably true that to have a number of its graduates in any military organization materially aids to elevate the standard of efficiency in that organization. This led us to recognize the equity of compelling a certain number of graduates to go into the infantry. Consequently, for four years the number of vacancies which cadets at the Military Academy were allowed to choose have

been apportioned to the four branches of the service—infantry, cavalry, field artillery, and coast artillery. After that number of vacancies have been chosen the balance in all those services are filled, first from the ranks and second from civil life.

Now, we are proposing in this bill, and on this we have agreed, that the Engineer Corps shall fare just the same as the rest of the army; that the number of graduates it shall receive from the Military Academy shall be in proportion to the number of officers that belong to the Engineer Corps. This is on the theory that thoroughly educated officers from West Point are just as badly needed in other branches of the service as they are in the Engineer Corps.

Now, I am glad to say that we have come to the conclusion that that will impose upon the Engineer Corps no material injury, and I will proceed to explain why. I have in my hand a list which shows the appointment of every man who ever graduated at the Military Academy, from the year 1802 to the year 1909. It shows how many cadets were assigned to the Engineer Corps, the topographic engineers, ordnance, light artillery, artillery, light dragoons, dragoons, cavalry, infantry, rifles, mounted rifles, mounted rangers, marines, field artillery, coast artillery, and the number not commissioned. I will not read those figures in all of those columns. It is useless. But I will hastily run down the list of figures in the column headed by the "Engineer Corps." Beginning with the year 1802 I will read the figures, and wherever there was none assigned to the engineers I will simply say "none:"

The United States Military Academy—Total number of graduates from 1802 to 1909.

Year.	Corps of Engineers.	Topographic engineers.	Ordnance.*	Light artillery.	Artillery.	Light dragoons.	Dragoons.	Cavalry.	Infantry.	Rifles.	Mounted rifles.	Mounted rangers.	Marines.	Not commissioned.	Aggregate number of graduates each year.
1802.	2														2
1803.	1				2										3
1804.					2										2
1805.	3														3
1806.	5				8				2						15
1807.					4				1						5
1808.	3			5	3				4						15
1809.					5	1			1						7
1810.															
1811.	1			6	5				6						19
1812.	2			8	3				5					1	18
1813.	1														1
1814.				9	18				1						30
1815.	6		8	9	17								1		40
1816.															
1817.					17										19
1818.	2	1	1	3	11				5						23
1819.	5		2	6	12				3	1					29
1820.	2		7	3	8				10						30
1821.	1				12				11						24
1822.	2				16				22						40
1823.	1				11				23						35
1824.	1				12				18						31
1825.	4				15				16				2		37
1826.					16				23						41
1827.	2				12				26						38
1828.					12				20					1	33

* Since 1874 entrance to Ordnance Corps has been by transfer after competitive examination from all arms of the service.

The United States Military Academy—Total number of graduates from 1802 to 1909—
Continued.

Year.	Corps of Engineers.	Topographic engineers.	Ordnance.	Light artillery.	Artillery.	Light dragoons.	Dragoons.	Cavalry.	Infantry.	Rifles.	Mounted rifles.	Mounted rangers.	Marines.	Not commissioned.	Aggregate number of graduates each year.
1829.	2				15				29						46
1830.	1				13				28						42
1831.	1				13				19						33
1832.					23				17			5			45
1833.	4				16				23						43
1834.	2				14		1		19						36
1835.	2				16		5		30						56
1836.	2				30		4		7						49
1837.	1				36		5		8						50
1838.					23		9		13						45
1839.	5	1	1		16		4		4						31
1840.	1		2		12		9		18						42
1841.	3		3		15		6		25						52
1842.	7	2	1		17		5		24						56
1843.		2			10				23	4					39
1844.		1			5		4		15						25
1845.	3	2	2		9		8		17						47
1846.	4	2	2		16		10		20		5				50
1847.					22				16						38
1848.	5	2			10		5		14		2				38
1849.	1	1	1	1	14		3		21		1				43
1850.	1	1	1		14		7		19		1				44
1851.	2		2		11		6		16		5				42
1852.		2	2		9		2		24		2				43
1853.	2	1	2		17		5		22		3				52
1854.	2	2	2		17		5		14		3				46
1855.	2				8		4	4	14		3		1		34
1856.	3	1	1		14		4	8	10		2				49
1857.	4	3	2		8		4	4	11		2				38
1858.	2	1	1		4		3	1	13		2				27
1859.	3	3	1		4		2	1	8						22
1860.	2	2			7		3	4	20		1				41
1861 (May).	3		3		19		5	4	10		1				45
1861 (June).	4	1	4		8		5	3	7		2				34
1862.	7		4		15			3							28
1863.	8		7		6			2		2					25
1864.	15		2						10						27
1865.	9				6		10		43						68
1866.	9		3		16		6		7						41
1867.	11		2		43		6		1						63
1868.	8		1		15		18		12						54
1869.					12		26							1	39
1870.					18		40								58
1871.							20		21						41
1872.							23		34						57
1873.	4				12		11		14						41
1874.	1				13		5		22						41
1875.	4				15		10		14						43
1876.					14		13		21						48
1877.	3				12		33		28						76
1878.	2				1		10		30						43
1879.	5						24		38						67
1880.	2				9		17		20					4	52
1881.	5				9		15		23					1	53
1882.	3				12		7		15						37
1883.	3				9		16		24						52
1884.	7				7		13		10						37
1885.	2				7		11		19						39
1886.	4				9		23		41						77
1887.	2				14		16		32						64
1888.	3				7		13		21						44
1889.	6				16		7		19					1	49
1890.	4				16		12		22						54
1891.	5						18		42						65
1892.	2				14		13		33						62
1893.	5				9		15		21					1	51
1894.	2						11		34						54
1895.	2				7		13		30						62
1896.	12				13		30		28						73
1897.	7				7		18		35						57
1898.	7				12				40						59

The United States Military Academy—Total number of graduates from 1802 to 1909—
Continued.

Year.	Corps of Engineers.	Topographic engineers.	Ordnance.	Light artillery.	Artillery.	Light dragoons.	Dragoons.	Cavalry.	Infantry.	Rifles.	Mounted rifles.	Mounted rangers.	Marines.	Not commissioned.	Aggregate number of graduates each year.
1809 (February).....	6				16			12	38						72
1900.....	5				17			22	10						54
1901 (February).....	10				28			34							74
1902 (June).....	7				14			23	10					2	54
1903 (June).....	11				18			21	43						93
1904.....	10				30			24	60						124
1905.....	13				34			18	45						111
1906.....	9				21			16	32						78
1907.....	8				^a 24			26	52						110
1908.....	9				^b 26			24	49						108
1909.....	15				^c 29			20	37						101
Total.....	353	31	72	49	1,351	1	136	797	1,963	5	35	5	5	13	4,846

^a In 1907, 6 assigned to field artillery and 18 to coast artillery corps.

^b In 1908, 7 assigned to field artillery and 19 to coast artillery corps.

^c In 1909, 9 assigned to field artillery and 20 to coast artillery corps.

You will see, Mr. Prince, that in 1864, 15 of the graduates were assigned to the Corps of Engineers. I just wanted to call your attention to the fact that the year 1864 was the first time that a large number of cadets were assigned to the Engineer Corps. That number was 15, as I said, largely due to casualties in war, deaths that had occurred in the Engineer Corps, and also to a slight increase in the size of the corps. Then it goes on from 9 to 11, and then down to 2 and 1. Then you will notice that since 1897 there has been an increase in the numbers assigned. There were 15 last year. That was because during the past ten years there have been three increases in the Engineer Corps.

Now, taking the Engineer Corps as it exists at the present time and assigning to it the quota of graduates that it would be entitled to, according to its strength of officers, it would get five and one-half graduates per year. If this bill goes through, it would be entitled to a little over seven graduates per year. If the Corps of Cadets is increased, as the bill now pending before Congress would increase it, the engineers would be entitled to about ten cadets a year.

Now, it appears to us that it would be largely recruited from West Point, provided those numbers were allowed each year. At any rate, we consider it equitable to include the engineers with the other branches of the service in apportioning graduates of the Military Academy. I am naturally interested in seeing that justice is done throughout the army—what I consider justice and equity. I am especially interested in the mobile army, because I belong to the mobile army, and it would be unnatural if engineer officers did not regret to give up the privilege of having the Corps of Engineers recruited exclusively from West Point. I have assumed that they would prefer it. At the same time these gentlemen are sufficiently liberal minded to see the equity and justice of the argument that I have urged with them. At any rate, they have agreed that, so far as their personal

view was concerned, my claims were equitable, and it is our intention if that law is revoked requiring that the Engineer Corps be filled exclusively from West Point to allot to the engineers their proportion of graduates, in common with all branches of the service, and allow them to fill the remainder of the vacancies from civil life under the provisions of this law.

Mr. PRINCE. Then you would not put them on a par with the other branches of the service in this, that if there are vacancies in the field artillery, coast artillery, or cavalry, or infantry, that the graduates are not enough to fill, the enlisted man comes next. The door is practically closed to the enlisted man here, is it not? If this provision should prevail he could not get in?

General BELL. No, sir; he could not.

Mr. PRINCE. But he could get into the field artillery?

General BELL. Yes; or any other branch of the line.

Mr. PRINCE. That is all, then.

General BELL. I would like to say, Mr. Prince, that I do not recall to have seen an enlisted man that could pass the examination for the Engineer Corps.

Mr. PRINCE. I was not contesting that. I was just bringing that out.

Mr. HAY. If there are ten vacancies now in the Engineer Corps, that does not follow that there will be ten every year?

General BELL. Not at all.

Mr. HAY. Now, I understand that the practice of appointing cadets from the Military Academy to the Engineer Corps has resulted in building up a corps in the army which is considered perhaps the superior of any similar corps anywhere?

General BELL. It is.

Mr. HAY. And the only reason now for appointing men from civil life is that it would not be equitable or fair to the other branches of the army to continue to do so?

General BELL. That is my judgment; yes, sir. And, Mr. Hay, I would like to say this: That there was a time when unquestionably the work of the Engineer Corps was more important than that of any other branch of the service. I personally feel that that time has passed, and that the standard of efficiency and the duties required of line officers have been elevated to such an extent that now their duty has assumed a comparative importance very much greater than it had before, and that is the theory upon which we base the proposition of hereafter allotting officers to the different branches of the service in equitable proportion to their strength in officers.

Shall I continue the testimony along the other line?

Mr. YOUNG. If you will. We want to finish this hearing this morning, if we can.

General BELL. Now with reference to that portion of the proposition which we have agreed upon, and which has been approved by the Secretary of War, I will say—

Mr. YOUNG. Is that section 2 you are referring to?

General BELL. Yes, sir; it is section 2. I will say the existing law, section 22 of the act approved February 2, 1901, as amended by the army appropriation bill for the fiscal year ending June 30, 1905, provides:

Any vacancies occurring at any time in the grade of second lieutenant shall be left for future promotions from the corps of cadets at the United States Military Academy.

That is the provision which limits the recruitment of the Engineer Corps exclusively to the Military Academy. If this provision remains on the statute and section 2 of the bill under discussion is inserted in the law, the corps of engineers would get graduates from the Military Academy independently of these provisions, one of which provides that all vacancies shall be filled from graduates of the Military Academy, and another provides that vacancies shall be filled partially by graduates of the Military Academy. Therefore it is recommended—I am now quoting from a provision which has been approved by the Secretary of War—"that all vacancies in the grade of second lieutenant in the Corps of Engineers shall hereafter be filled, as far as may be consistent with the interests of the military service, by promotions from the corps of cadets at the Military Academy: *Provided*, That vacancies not filled in any calendar year by the promotion of such cadets may be filled from civil life, as hereinafter provided."

That is a substitute for section 2.

It is also recommended that the following section be added to the bill as section 6:

That all laws and parts of laws inconsistent with the provisions of this act be, and the same are hereby, repealed.

Mr. Young, do you desire any view from me on the question of proposed increase in rank? I noticed there was some objection raised to it in the committee. I would like to say I am entirely in favor of that, and could give some good reasons why it should be done.

Mr. STEVENS. I think such reasons ought to appear of record.

Mr. YOUNG. We would like to hear from you on that subject, General.

General BELL. The average age at which officers of the Corps of Engineers whose names are now borne on the Register have reached their grade, compiled from the Register of 1909, is as follows:

Comparative statement of ages at which officers of the line of the army and of the Corps of Engineers, respectively, reach their grades.

	Second lieutenant.	First lieutenant.	Captain.	Major.	Lieutenant-colonel.	Colonel.
Average age at which officers of the line of the army reach their grades (quoted from letter of the Secretary of War to the chairman Committee on Military Affairs in re the elimination bill, and dated May 25, 1908; compiled from records of The Adjutant-General's Office, 1883 to 1897, inclusive).....	23	29.436	38.553	51.863	57.033	59.452
Average age at which officers of the Corps of Engineers reach their grades (compiled from engineer officers on the Army Register of 1909).....	22.99	25.136	30.225	39.908	48.8	57.827
Difference.....		4.3	8.328	11.955	8.233	1.625

You will notice, gentlemen, there is a very sudden jump between lieutenant-colonels and colonels; that an officer must have remained in the grade of lieutenant-colonel nearly ten years before receiving his promotion to colonel. This can only be due to one thing, and that is an insufficient number of colonels to make the promotion uniform throughout the line of grades.

I have these ages contrasted with those now prevailing in the line, and although all of them are lower in age than the corresponding ages at which officers of the line arrive at their grades, there is no very great difference. In the grade of colonel it is about the same, the line arriving at their grades a little older only. At any rate, the Engineer Corps to-day, with the exception of the line and the Medical Department, has the slowest promotion in the army. Its promotion is nothing like as good as it is in several of our staff corps, but, of course, it is better than it is in the line. However, there is no part—

Mr. YOUNG. Right there, General, promotion in the line is fixed largely by the organization of the army—so many places to fill?

General BELL. By the peculiar organization which is necessary for line troops.

Mr. YOUNG. That can not be helped?

General BELL. Only by giving a greater number in the higher grades in what is known as the "extra officers bill"—a very just and equitable way of expediting promotion in the line of the army and minimizing what now afflicts the army to a great extent, which is superannuation in the officers of the field grades in the line of the army.

Now, I believe it equitable and just that the number of officers in the higher grades of the Engineer Corps should be increased. It will then be below the proportionate number in the whole line of the navy in corresponding grades.

I hope that this increase will be given to the Engineer Corps, because it is equitable and just and right, but I also hope that Congress may some time come to see that what is equitable and just and right for the Engineer Corps is also equitable and just and right for the line of the army.

I have here a sheet which I shall introduce into the hearings merely for the information of the committee, if it desires it, in which the different percentages in the grades under the Engineer Corps, under the various acts increasing the corps, have been worked out. It contains statistics that might be valuable to the committee.

Mr. YOUNG. Give it to the stenographer, General.

General BELL. I will. Here it is:

The following table shows the ratio of engineer officers in each grade to the total number in the corps under previous acts, under present conditions, and under the proposed act. It also shows corresponding ratios for the Medical Corps, the only other staff corps not subject to detail from the line of the army, the ratios for the line of the army, and the ratios and numbers in each grade which the proposed act would have if assimilated more nearly with the Medical Corps.

Ratio in Engineer Corps of officers in each grade to total number in corps.

	Brigadier-generals.	Colonels.	Lieutenant-colonels.	Majors.	Captains.	Lieutenants.
Previous to 1898.....	0.009	0.055	0.110	0.220	0.275	0.330
Under act of July 5, 1898.....	.008	.055	.110	.220	.276	.378
Under act of February 2, 1901.....	.006	.044	.087	.175	.250	.438
Under act of April 23, 1904.....	.005	.052	.080	.170	.230	.460
Under proposed act.....	.004	.060	.089	.206	.242	.399
Medical Corps as now provided by law.....	.003	.030	.050	.220	a 0.607	
Line, exclusive of engineers, as now provided by law.....	.007	.032	.041	.093	.309	.518

a Captains or lieutenants.

Mr. YOUNG. Is there anything you wish to say about section 3?

General BELL. Section 3 we have all agreed shall stand just as it is written, and the Secretary of War has approved that conclusion.

Mr. YOUNG. That is sufficient on that.

General BELL. Section 4 the same; section 5 the same. We do desire to substitute for section 2 what I have read into my testimony. I will furnish the stenographer with a written copy of that which will be agreed to by all of us.

Mr. YOUNG. As it was read?

General BELL. Yes, sir; as it was read, and that, then, becomes the only section of the bill to which we have any objection whatever, and we simply want to substitute a new section, and in that new section the engineers and myself will all agree, and the Secretary of War will approve—these two gentlemen representing the office of the Chief of Engineers.

Mr. YOUNG. The real change, as I take it, General, from what it is under the law as it now stands, is that the Engineers would get all the increase of this corps from West Point, and you wish to give them only something like 40 per cent; that is, unless we increase the number of cadets at West Point. With this change they would have 43 per cent of that, and the rest of the officers you would have to get from civil life?

General BELL. No.

Mr. YOUNG. If they get only their proportion, and we do not increase the number at West Point—

General BELL. The reason, Mr. Young, that that 43 per cent is so low is because there have been numerous increases of the army since 1898, and large increments of officers have come in from civil life. But in the future the proportion of graduates to the proportion annually appointed will be very much larger.

Mr. YOUNG. It is only 43 per cent at present?

General BELL. Of the whole corps of officers of the army only 43 per cent are graduates, which is because of the large number of civilians appointed subsequent to 1898. In the future, if the committee and Congress make the increase which is recommended and which has passed the Senate, the proportion of vacancies filled from West Point would be about 80 per cent.

This argument presented by the office of the Chief of Engineers indicates that there will be, during the next year, natural vacancies—

Colonel ABBOT. Eight vacancies up to 1920, natural vacancies.

Captain HAGOOD. Whereas their proportion during that time would be about 80.

General BELL. Mr. Young, it is found by our present rule that there are frequently not enough vacancies in one of the branches to allow it to have its full proportion of graduates. That excess goes to the other branches. It has been the case twice recently in the cavalry. There were not as many vacancies in that branch as its proportionate share of graduates, and consequently what vacancies it had were filled and the surplus went to the other branches.

It is probable that the proportion due the Corps of Engineers, if the corps of cadets is increased, will be sufficient to fill it for some years to come. That is because there is an exceptionally small number of expected vacancies.

Mr. YOUNG. Is that all, General?

General BELL. I believe that is all, sir.

I would like very much indeed if the committee would let me make an explanation to it some time about that proposed increase in the corps of cadets, because it has a very marked bearing on this question.

Mr. STEVENS. I do not think it would be wise to do it here.

General BELL. Not now, but I would like to do it sometime.

Mr. YOUNG. We shall be glad to have you do it sometime.

General BELL. Mr. Young, the committee has an entirely erroneous impression of the effect of that increase, and I can show that the effect is nothing like what the committee anticipates.

Mr. YOUNG. I do not know what any member of the committee thinks about that except myself.

General BELL. I would like to add just one thing. The President of the United States stated to the academic board in my hearing two years ago that he was very doubtful of the wisdom of taking so many graduates from an exclusively military school maintained by the Government for the education of army officers and putting them in a corps where a great part of their work was civil engineering, and I disagreed with that opinion at that time. But subsequently, upon investigation of the matter, I changed my view, and I asked the President the other day if he was still of the same opinion, and he told me he was, and that I was at liberty to so quote him in my testimony.

NOTE BY GENERAL BELL.—In revising my testimony I incorporate herewith a subsequent report upon this bill by the Secretary of War, which explains in detail the various amendments to the bill which have been mutually agreed upon by the Chief of Staff, General Mackenzie, Colonel Abbot, and Major Ladue, and have been approved by the Secretary of War.

WAR DEPARTMENT,
Washington, March 12, 1910.

Hon. JOHN A. T. HULL,
*Chairman Committee on Military Affairs,
House of Representatives, United States.*

SIR: 1. Referring to a bill, H. R. 7117, Sixty-first Congress, first session, entitled, "A bill to increase the efficiency of the Engineer Corps of the United States Army," referred to this department for information and remark, I have the honor to inform you as follows:

2. This bill has now been thoroughly considered by members of the General Staff, by the Chief of Staff, and by the Acting Chief of Engineers, and they concur in recommending that the following modifications therein be made:

On page 1, lines 10 and 11, strike out the words "from the date of the approval of this act," and in line 12 strike out the word "calendar" and substitute therefor the word "fiscal."

3. On page 2 strike out section 2 and substitute the following:

"Sec. 2. That vacancies in the grade of second lieutenant in the Corps of Engineers shall hereafter be filled, as far as may be consistent with the interests of the military service, by promotions from the corps of cadets at the United States Military Academy: *Provided*, That vacancies remaining in any fiscal year after the assignment of cadets of the class graduating in that fiscal year may be filled from civil life as hereinafter provided: *And provided further*, That the proportion of any graduating class assigned to the Corps of Engineers shall not be less than the proportion which the total number of officers authorized at date of graduation for that corps bears to the total number of officers authorized at same date for all branches of the Army to which cadets are eligible for promotion upon graduation except when such a proportionate number is more than the number of vacancies existing at date of graduation plus the number of retirements due to occur in the Corps of Engineers prior to the 1st day of the following January."

4. On page 3 add a new section, as follows:

"Sec. 6. That the provisions of this act shall take effect July 1, 1910, and that all laws and parts of laws inconsistent with the provisions of this act be, and the same are hereby, repealed."

5. A copy of the bill, amended as above recommended, is inclosed herewith, and I concur in the recommendation of the Chief of Staff and the Acting Chief of Engineers that it receive favorable consideration.

6. Request is made that this report be substituted for the one submitted to you upon this bill under date of March 9, 1910.

Very respectfully,

J. M. DICKINSON, *Secretary of War.*

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